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WALL STREET depression seems to have very little effect upon the West. Everywhere business is active and there is abundant evidence of prosperity. Money is plentiful, manufacturers are busy, and the railroads have more than they can do; while the hopeful feeling for the future is very strongly marked. "Undigested securities" are not troubling the alimentary system of the active and vigorous West.

SUFFICIENT EXPLORATION work has now been done on the new Baraboo Iron Range in Wisconsin to show the existence of large quantities of iron ore of merchantable quality. It also indicates the possibility of a considerable extension of the field beyond the limits at first set. Prospecting is going on actively, most of it under intelligent direction, and we may expect to hear more of the new range before long. The ore deposits are well situated as regards transportation, and advantageous rates can be secured to Chicago, Milwaukee and other points on Lake Michigan. Shipments can be made by rail all the year round. The range is in the Baraboo Valley, in Southern Wisconsin, and presents some points of geological interest, to which we hope to refer later.

SINCE THE DEPRESSION of 1896-98, the iron ranges of the Lake Superior country have been fairly free from labor troubles. At the present time labor in that region is generally well employed, wages are good, and nothing is heard of strikes. It is said, however, that an effort is to be made to organize the miners throughout the district; doubtless with a view to a general movement for higher wages and other changes. It is possible that this may succeed, but it is to be hoped that present conditions may continue. Unionizing is more likely to be successful on the Mesabi than on the old ranges. The men in the Minnesota field are more changeable and restless than those in the Michigan mines, and more open to union influence. A large proportion of the workers in both fields are of foreign extraction, but those on the Mesabi are generally later comers, and have no ties to house, or other property to hold them.

IT IS A FACT worthy of mention that our issue of July 25, containing remarks upon the future of the Royal School of Mines, has brought responses from men whose names are well known to our readers and who wrote to us from Carniola, in Austria; from Norway; from Linares, in Spain; from Ontario, Canada, and from Valdez, Alaska. The geographical distribution is worthy of note.

THE GREAT PLANT at the Sault Ste. Marie is now lying idle, pending the proposed reorganization of the company, to provide means for carrying it on. The expectations of Mr. Clergue and his adherents, apparently, will not be realized for some time. An examination of the plant is needed to enable one to appreciate the large amount of money that has been spent, and the extent of the plans laid. At the same time it reveals certain defects in design and organization, which it will be difficult to overcome without some further expenditure. Whether this can be wisely made, it is for the owners to determine. Important points are the lack of ore supply from Canada, the Helen mine having fallen below expectations so far; and the cost of fuel supply. Meantime a large part of the plant is ready to be operated, and it is to be hoped that something will be done, before it begins to deteriorate, as idle plants will do.

ORE SHIPMENTS from the Mesabi Range, which were most actively pushed during the first part of the season, are now a little slower. Some of the large mines—like the Fayal—are still being rushed; but several mines, which have put out the minimum quantities required by their respective leases, have been closed down, while at others a part of the ore mined is going into the stock-piles. The shipments of ore this season will equal those of last year, but it seems doubtful, now, whether there will be any considerable increase.

Exploration continues very active through the region, and many drilling outfits are at work. The success met with is sufficient to encourage others, and to put a high premium on leases and options. There have been reports current of the discovery of hard ore not far from the Biwabik mine. These may refer to some extension of a vein of hard ore found in the Biwabik itself. This, however, is found only in a few narrow streaks, and very little importance is attached to the alleged new discovery.

THE REPORTS that the Copper Range Consolidated Company has passed under the control of the Amalgamated Company, have been based upon the recent violent fluctuations in the stock. These are said to be largely the result of buying for a majority interest. It is quite possible that they are true, though there are

no means of ascertaining the fact. The Amalgamated is known to desire a foothold in the Lake country, and Copper Range may serve that purpose. The failure to make a mine out of the Arcadian, in spite of the money spent there, seems to have prevented further work on new mines for the Amalgamated Company, but doubtless it has not given up the attempt. It is rumored also that the Amalgamated can acquire—possibly has acquired—the control of the Tamarack. This is hardly new, since the Amalgamated people have been for some time in a position where they could secure the Tamarack and its allied corporations at any time they might want them.

NOTWITHSTANDING the great expansion on the Mesabi Range, the older iron ranges in Michigan have not given up competition, by any means. Work is very active on the Marquette and Menominee ranges, and the output of the mines there, for this season, will be greater than ever before. New mines are being opened and old mines extended, giving evidence of a long and vigorous life in the future. The somewhat greater cost of mining, pumping, etc., is made up by the value of the ores and the necessity of using them as mixtures with the soft Mesabi ores in the blast furnace. Exploration is going on for new deposits, though not to the same extent as in the newer field.

CONDITIONS IN British Columbia are gradually improving. The success of the big copper mines in the Boundary district has stimulated exploration there and elsewhere. The Rossland mines are doing much better, under careful and business-like management; while encouraging reports come from Vancouver Island and the Coast districts. The weak point is in the continued idleness, or semi-idleness of the silver-lead mines in the Kootenay and elsewhere. The proposed bounties on lead refined in Canada may benefit these mines, which have practically no outlet at present for their product; shut out of the United States by the tariff, they have to compete in the comparatively limited market of Canada with British and Spanish lead, which can be sold there at a lower price than the British Columbia mines can afford to make.

The eight-hour law in this province is not working well, and has made a good deal of trouble. The increased cost of labor is injuring many of the smaller mines, and may result in closing down many of them. There has been a good deal of friction over the matter, and the labor situation is far from being satisfactory.

INDEPENDENT IRON ORE PRODUCERS.

In view of the absorption of iron mines and iron ore deposits by the United States Steel Corporation, it is suggested that the independent producers may be obliged to form a union of some kind to save themselves from being driven out of the market, or being forced to depend upon their great rival for ore. The two alternatives would probably lead to the same end, giving the Corporation absolute control of the iron trade. As matters stand at present, no single independent concern can oppose the trust in the competition for mines. Its command of capital, and of means of transportation also, enable it to secure properties easily, and to shut out others when it may seem expedient. The prices paid may be high, but the ore is secured.

A combination of the independent iron and steel concerns, on the one hand, and of the independent ore producers on the other, seems to have many points to recommend it, even if it is not absolutely necessary. The main difficulty would be in the preliminary arrangements, and in limiting the combination to the single purpose of supplying ore. Many of the mine operators would welcome some arrangement of the kind, which would secure them a market for their output. At present, they can find that; but with any marked curtailment of iron production, the trust might find it expedient to keep its mines open and sell ore, rather than to disband its forces and close some of its mines.

This suggestion—which is not original with us, but comes from a mine operator—certainly deserves consideration. We do not indicate, at present, how it can be carried out. Much planning of details and adjustment of various interests would be required. Some independent concerns already own mines, and might be reluctant to join in such a movement, holding themselves already safe; but some organization could be formed without them, to which they might probably be willing to adhere at a later time.

THE LEAD CONSOLIDATIONS.

With the organization of the United Lead Company and the new concern which is taking over all the principal mines of the Coeur d'Alenes, the lead industry of the United States has become fairly well consolidated. The mines of the Coeur d'Alenes are the chief producers of the raw material, their product, which is shipped in the form of high-grade galena concentrates, furnishing about 40 per cent of the domestic production of lead. The smelting industry is effectually concentrated in the hands of the American Smelting & Refining Company. The manufacturing industry is now practically divided between the National Lead Company and the United Lead Company. There are a few concerns which remain outside, but they are of no great importance. The National Lead Company and the United Lead Company will be to a certain extent competitors, although at the present time there is considerable difference in their principal interests. The National Lead Company is essentially a producer of white and red lead, but to a comparatively small extent is engaged in the manufacture of sheet, pipe and other metallic products. The United Lead Company has taken over the principal factories making shot, sheet, pipe and lead alloys, but has also acquired certain white lead works which had remained heretofore independent. One of its chief assets in the last line is the property of the Union Lead & Oil Company, including the Bradley patents, the value of which is, as yet, undetermined. It has been given out at various times during the last two or three years that they were going to revolutionize the white lead business by effecting an overwhelming reduction in the cost of production, but, so far, this has not been accomplished.

There have been various rumors as to the effect that these recent consolidations would have upon the American Smelting & Refining Company and the lead business in general. In spite of the fact that the National Lead Company refused to enter the United Lead Company, however, it is probable that there will be no serious competition between the two. Standard Oil interests are said to be in the Coeur d'Alene combination. They are known to be potent in the American Smelting & Refining Company and in the United Lead Company. They are supposed to be very largely interested in the National Lead Company. As far as the Coeur d'Alene combination is concerned, it is probable that the interest of the Standard people is limited to the smelting plant at Monte Cristo, in Washington, which was owned by Mr. Rockefeller, and has been put into the consolidation at a high nominal value. This is, however, enough to give Standard interests a considerable share in the new company.

It is a reasonable surmise, therefore, that the four big companies will co-operate to a large extent upon the basis of a community of interest, requiring the independent purchasers on the one hand and the ultimate consumers of the product on the other hand to yield up the profits. If there be such community of interest the position of the American Smelting & Refining Company will be strengthened with respect to the independent lead producers of Southeastern Missouri and it will also be better able to defeat projects for competitive smelting works in the West, as to which there has been more or less talk from time to time.

MEXICAN TAXES ON BULLION.

In our issue of March 14 last, we referred to Mexican taxation on bullion in order to emphasize the fact that it is a serious item in any estimate of costs. It has come to our knowledge that in two or three valuations of mines, as based upon estimates of net profit per ton of ore, this item has been overlooked altogether or incorrectly stated. As it may lead to unfortunate discrepancies, we bring the subject forward again.

The costs of turning gold and silver bullion, from a Mexican mine, into money are as follows: Federal taxes, which include (1) a coinage duty of 2 per cent; (2) a stamp duty of 3 per cent, and (3) Government assayer's fee of $2.50 per bar of 35 kg., or a fraction thereof; State taxes which include (1) an export duty of 2 per cent and (2) a stamp duty levied by the Federal government of 25 per cent on the State export duty of 2 per cent.

It is also important to note that for the purpose of collecting the Federal taxes, silver is valued at $40.195 per kilogram, and the gold at $675.416, in addition to which the rate of exchange on gold for the first fifteen days of the previous month is added to the gold valuation and the duties collected on that sum. The different States have various valuations for gold which include exchange. In Sonora it is $1,125.72 per kilo. In every case the engineer examining a mine for purchase or sale should inform himself on these matters. If he sails in with a rough calculation that the gold in his ore is worth $20 in United States currency and his silver 52c., United States currency, he will make a serious blunder. In the statement of taxes, as quoted above, the Mexican dollar is, of course, the unit.

In the case of a representative mine located on the railroad in northwestern Mexico the figures for a period of nine months show that the expenses on cyanide bullion for duties, expressage, refining and melting amounted altogether to 9 per cent, while similar expenses on mill bullion during the same period averaged nearly 8¼ per cent of the gross value of the bullion.

These deductions are serious items, and may be taken roughly to vary from 8 to 12½ per cent of the yield of the ore as measured in money, depending on the location of the mine, its distance from the railroad, the modes of communication, fineness of the bullion produced, etc. It will be seen that the taxes, including the assayer's fee and the federal impost of 25 per cent of the State taxes, exceed 7 per cent, while, as indicated above, the express and refining charges vary. If a mine is off the railroad, it is necessary to add, to the above, the cost of transport of the bullion from the mine to the express office and the expenses of insurance against robbery. These charges vary, with locality and distance, from one per cent to as much as three per cent. These are all everyday practical matters, not to be disregarded in formulating a conscientious estimate of the net profit to be obtained from the ore reserves of a mine. Suppose a mine located at a distance from the railroad produces ore that yields $20 per ton, the mine and mill costs are $10, and it costs further 11 per cent of

the bullion yield to mint it, the net profit will be diminished by $2.20, leaving the final figure at $7.80, as against $10, which would be the estimate of any one who disregarded the deductions to which we have drawn attention.

DEPRECIATION FUNDS.

The question of depreciation of mining properties, and of the establishment of funds to provide for, or offset, the gradual exhaustion of such properties, has been discussed in these columns heretofore. With the ordinary mining corporation, it may be well to leave it to the discretion of the owners, whether the profits shall all be paid to them as they accrue, leaving them to make arrangements as they please with regard to the replacement of their original investments. This is the plan usually adopted in this country. The other alternative is to have the company set aside a depreciation fund, or sinking fund, sufficient to provide for the payment of the capital stock, when the mine becomes exhausted. This plan is frequently adopted in England, and is compulsory in France, where the law requires certain proportions of the income to be paid yearly into such an amortization fund. There are points in favor of both plans, which need not be recapitulated here.

While either course may be adopted, with propriety, by an ordinary mining company, a new class of corporations has grown up within recent years, to which the depreciation fund seems to be a necessity. This is especially the case in the iron industry, where it has now become a custom, if not a necessity, for large concerns to control the whole process, from the mining of the ore to the marketing of the finished product. Formerly the blast-furnace owner bought his ore from the miner, and sold his pig iron to the puddler or the steel-maker, who, in his turn, furnished blooms or billets to the rolling mill. Now these transfers go on upon a small scale only; the large companies combine them all under one ownership.

To companies of this kind it is absolutely essential that provision must be made for the maintenance of their reserves of iron ore, which constitute the foundation of the whole business. New development work must constantly be carried on, new explorations for ore made, and, at intervals varying according to circumstances, new properties must be acquired. All this requires large sums of money, and it is not just to stockholders, or good finance, to provide the funds by new issues of securities, which would really represent less than nothing; that is, they would stand for what has been consumed, not for new property.

The correct plan in such cases is the depreciation fund, or sinking fund. A charge for every ton of ore taken out should be made, in whatever form may be most convenient. It ought, at any rate, to be sufficient to keep up the ore reserves owned, and to prevent any chance of their exhaustion while the company's business continues.

In some cases, we believe, that these facts are recognized, and full, or partial, provisions made. It will pay investors to look carefully into the matter.

MARKET CONDITIONS.

The metal markets generally showed little change during the week. Business remains very active in some directions, although in others conditions are not quite so favorable.

Copper is very quiet. Consumers seem to have supplied themselves for all present needs during the recent period of activity. But few transactions are reported, and those are generally of a small description. Prices have consequently been rather nominal, and the market has a weaker tendency than has been recently recorded.

Tin is flat, and no special demand can be reported. Consumption has been somewhat disappointing, and the situation is reflected in the prices.

Lead is in very strong demand, and while prices are nominally unchanged, the principal sellers refuse to guarantee time of deliveries, owing to the difficulty of getting supplies forward, and the scarcity of spot metal. It is reported that in some cases premiums have been paid for early deliveries. The cause of the heavy consumption is not altogether clear, but the fact is undoubted.

Spelter also continues strong, and prices are well maintained. There is no doubt that the consumption at the present time is slightly ahead of production, and the smelters find it difficult to keep up with deliveries that are called for.

Silver continues to be in fair demand for the East, but there is less pressure to buy, and quotations are a little lower. The short interest in London appears to be now fairly covered, and speculation in the metal is quiet.

The American Smelting and Refining Company shows a very favorable statement for the year ending June 30, which we hope to present in full later. It is reported that the directors are considering the question of paying a dividend on the common stock, which has thus far received nothing.

The iron and steel markets continue to present somewhat disappointing conditions. Recovery is rather slow to come, and, while trade is improving slightly, there are no indications of the upward reaction in prices, which certain parties have promised us from time to time. In raw material a little more business is reported in foundry irons, purchases being mainly, however, in moderate-sized lots for short deliveries. There appears to be considerable competition for what business is going, and prices are a little irregular. Southern iron has been offered on the basis of $11.25, Birmingham, for No. 2 foundry, which is 75c. under the nominal price. Northern furnaces are meeting these prices, although cuts are made so quietly that it is difficult to get the exact facts. In steel billets several large buyers are said to be holding back, with the belief that a concession of $2 per ton or so will be made by the Billet Association price. In finished material the story is very much the same. Some cutting in bars has been followed by a lot of business, and there is also an active demand for pipes and tubes, but in the rest of the market business is quiet. The only encouraging point is the report of an improved demand for nails, and for building necessities, showing that work throughout the country is not falling off.

The Western coal markets are in fair condition, so far as local demand is concerned. Factories in the Western cities are generally making good demands for fuel, and business is progressing steadily. The demand for anthracite in the West is falling off a little, indicating that consumers are generally pretty well stocked up. The Lake trade continues active, and shipments are being rushed forward with a haste which is made possible by the good supply of upbound tonnage. A good deal of apprehension is felt in the West as to transportation, and complaints are already being heard of car shortage.

The seaboard bituminous trade continues quiet and rather dull, although improvement is anticipated before long. Care supply is generally sufficient, considering the poor demand for coal.

The anthracite trade is quiet, and is likely to remain so until the coming of cold weather. There is a large tonnage still going forward, particularly to the Northwest and to points east of Cape Cod; but orders are falling off, and it seems likely that the companies will not try to get out the full capacity of their mines this month.

METALLICS.

The variety of rocks in which quicksilver is found is great, including limestones, sandstones and shales, many kinds of metamorphic strata and massive rocks of every type.

The minerals found in association with cinnabar are few in number and substantially the same in all deposits. They are crystalline silica, opal, calcite and dolomite.

Recent experiments with the Moissan process for the artificial production of diamonds have shown that crystals of perfect octahedral form and transparency may be obtained by the fusion of a rock similar to the matrix of the South African diamonds. The crystals, however, are of microscopic size.

The loading of a 35-ton railroad car with iron ore, by steam-shovel in the mine, in three minutes, comes pretty near eliminating the elements of time and manual labor in mining. Dumping ore into a vessel's hold at the rate of 60 tons a minute likewise seems to be about as close as it is possible to get to eliminating one important element of time in transportation.

The most recent investigations of earthquake phenomena show that in large disturbances two sets of earth tremors are generated. The preliminary waves have periods of less than five seconds, and travel at the rate of 2 kilometers per second during the first 1,000 kilometers. The second class of waves, with periods varying from 15 to 30 seconds, travel more slowly, reaching a point 80° from their origin in about 50 minutes, as compared with 15 minutes for the smaller waves. Earthquakes are most frequent in regions of great crustal folding and disturbance.

The volcanic eruptions which devastated the islands of Martinique and St. Vincent in May, 1902, revealed a new phase of nature's dynamic processes. The first scientists to arrive on the scene of disaster were quite unanimous in the opinion that the fiery cloud which swept over St. Pierre contained explosive gases. More careful investigations, however, have shown that the devastating agency was steam surcharged with incandescent ashes, the whole mass being impelled with hurricane violence by the eruptic forces behind it. In the list of great volcanic cataclysms there is no record of such destruction being wrought by a steam blast, although there is some reason for believing that similar phenomena may have accompanied the great eruption of Vesuvius which destroyed Pompeii.

Experiments made in the chemical laboratory of the University of California have demonstrated that the heating value of California petroleum is between 10,000 and 11,000 calories, averaging about 10,500 calories. The best coals of the Pacific Coast average 7,000 to 8,000 calories; the usual steam coals, much less. Comparing the cost of oil at $1.25 to $1.50 per barrel with the cost of coal on the basis of the theoretical heating values, a ton of oil would be worth $6 to $8, against coal at $8 to $9. The actual difference is very much greater than this, since there is much less waste in oil heating. Numerous actual experiments made under boilers have shown that 4 to 4.5 barrels of oil are equivalent to 2,240 lb. of good coal, wherefore coal cannot compete with petroleum at the present prices, nor can it unless its cost be reduced to between $4 and $5 per ton. Oil is selling now in San Francisco at less than 70c. per barrel.

DISCUSSION.

Readers are invited to use this department for the discussion of questions arising in technical practice or suggested by articles appearing in the ENGINEERING AND MINING JOURNAL.

ORE DEPOSITION.

The Editor:

Sir.—Absence in the West during the vacation has prevented the writer from reading until recently the valuable and interesting addition to the discussion regarding ore deposits, which was contributed to the columns of the JOURNAL in June by Mr. C. W. Purington and which has been reprinted in the separate volume now being distributed. Mr. Purington places before American readers many observations made in Siberia and other parts of the world which are of great value and which are extremely suggestive. The association of gold with basic igneous rocks and its genetic connection with basic intrusives, even when it is found in silicious walls, will tend to stimulate observation and reflection. These relations have also an important bearing in a general way upon the genetic connection between eruptive rocks and ore formation and will unquestionably be carefully pondered by all who follow the discussion now in progress. At the same time, the almost universal association of gold with quartz, the apparently well authenticated cases of its occurrence as an original mineral in acidic rocks, which have been described by Moericke, G. P. Merrill, Spurr and others make one conservative about a too prompt surrender of the latter view.

Mr. Purington's method of expression strikes me as at times unfortunate, although doubtless unintentionally so. On page 85 of the little volume he refers as follows to Mr. Spurr's observations in the Southern Appalachians. Speaking of one of the latter's statements, he says: "This is true." It is not true, however, as Mr. Spurr affirms, that a vein, etc. Instead of "true" and "untrue," the words "correct" and "incorrect," qualified by some such phrase as "in my opinion" would have been more courteous, as a moment's reflection will show. But aside from all questions of courtesy, Mr. Spurr's impressions of ore deposits in the Southern Appalachians, especially with regard to gold, are unquestionably those of a large number of experienced mining engineers who have had to deal with them.

Again at the foot of page 86, Mr. Purington's reference to Professor Richard Beck, the worthy successor of Von Cotta and Stelzner at the Mining Academy of Freiberg, strikes me as somewhat cavalier, and Mr. Purington will find it difficult to convince geological readers in general that Professor Beck's observations and interpretation of the phenomena at Beresovsk or elsewhere are not worthy of the greatest confidence, and are not to be properly and eagerly quoted by Mr. Weed or any other writer to whose thesis they may lend support.

On page 73, Mr. Purington finds some ambiguity in my use of the term pegmatite with the almost tacit assumption on my part that the pegmatites occur in veins, or, as many think, in dikes. When one learns from the subsequent text that Mr. Purington's conception of the typical pegmatite is that the latter forms a localized and coarsely crystalline phase of an otherwise normal eruptive mass, as against an occurrence in veins or dikes, believed by him to be exceptional, this supposed ambiguity is not surprising.

Nevertheless I am convinced that the sense in which I used the word is the one generally held by geologists and especially by petrographers; that the vast majority of the pegmatites which have been studied, occur in fissures in walls of a different rock; that they present entirely analogous phenomena to ordinary veins; and, in connection with the study of the latter they are of significance all too slightly appreciated.

Mr. Philip Argall's observations in Gilpin and Clear Creek counties tally perfectly with my own in the same region. There are hundreds, it may be thousands, of these veins cutting not only granite, but dark gneisses as well. The observations of Mr. H. Kilburn Scott in Brazil, which Mr. Purington cites, can also be fully corroborated upon Manhattan Island, where, for example, we have pegmatites of all widths up to 12 or 15 ft. cutting mica schists, gneisses and crystalline dolomites indifferently. In most beautiful and instructive fashion they illustrate nearly all the phenomena of veins, such as banded veins, blind veins, bed-veins, pinching and offsetting veins, variations in vein filling and gradations from granitic mixtures up to those which are largely, if not almost entirely quartz.

Now the question of the nature of pegmatites has been one of the most interesting of those which have been debated during the last 20 or 30 years. Some observers have urged that they are essentially igneous, having cooled from fusion, albeit, in association with abnormal quantities of steam or other mineralizers. Others have urged their essential nature as veins and have placed emphasis upon the part played by solution at high temperatures.

Of course, a discussion of this sort could only center around those pegmatites which have filled fissures in rocks of a different nature. If the pegmatite forms a local phase in an eruptive mass, it is essentially eruptive like the rest. One only needs to refer to the three or four principal papers upon them to discover the currency and correctness of the usage employed by me. Thus in the contributions of Crosby and Fuller[1] and of George H. Williams[2] which are the two best known in America treating of this subject, picture after picture is given in illustration of the text, yet they all exhibit veins (or dikes). In fact the very title of the most important mineralogical monograph of recent years is "Die Syenitpegmatitgänge der Südnorwegischen Augit-und Nephelinsyenite." (The syenitic pegmatite dikes of the augite and nepheline syenites of southern Norway.) In it Professor Broegger concludes that the pegmatites are igneous phenomena, but that they occur otherwise than in "Gänge," which word is used in German indifferently for dikes and veins, never seems to suggest itself.

I do not wish to urge this matter unduly, for the difference of conception may not seem to be of vital importance, but it is regarding these very points of inaccurate knowledge or half-knowledge that Mr. Purington in various places expresses himself in terms of the most caustic criticism of other unfortunates, whereas a fellow-feeling should make him more "wondrous kind."

Toward the close of his paper Mr. Purington takes me somewhat severely to task for certain citations believed by him to have been loosely or inaccurately made, and to furnish a text for a short homily with whose general doctrines only a person of most abandoned depravity could fail to agree. There appears to be some reason for Mr. Purington's criticisms even though they impress me as a large funeral over a small baby, and I cannot but express my gratification at the opportunity to clear away any misconceptions or mistakes. The circumstances when briefly stated are as follows:

Mr. Spurr, writing, as I believe, in Turkey and away from original sources of reference, cited my citations on the San Juan region of Colorado, as given in the Ore Deposits of the United States and Canada. These citations are quite fully reproduced by Mr. Purington and need not be repeated here. I will only say that I have again read them in the text-book referred to; and while they are condensed and brief, they are, I believe, correctly given, and being in a text-book which aims to give a conspectus of the literature, the citations are not only proper but inevitable.

At the time that both the "Ore Deposits" and the paper on the "Rôle of the Igneous Rocks, etc.," were prepared and printed, Mr. Ransome's bulletin on the Silverton quadrangle had not been seen by me, nor did I know of its existence. The time of the issue is not very different from that of the "Rôle, etc.," but the manuscript of the Ore Deposits was prepared the previous year. I therefore dismiss Mr. Ransome's paper from the discussion.

That I have not yet had the privilege of visiting the San Juan, as Mr. Purington remarks, is a serious disadvantage, but he does not seem to fully appreciate that the demands upon the time and strength of one who teaches in a university are exacting; that the attractive and important mining districts of North America are numerous; and that when these districts have been carefully studied and described by competent observers it is the natural disposition of the teacher to devote a part of his vacation to breaking away into regions less fully investigated. I hope that at some future day, however, the long cherished hope of visiting the San Juan may be realized.

I cannot forbear expressing a word of praise of the careful methods of field-work, with which Mr. Purington gathered his observations far up the steep talus slopes and in the lonely drifts, for, although these are the methods of every conscientious mining engineer and of every geologist who is worth his salt, yet the San Juan is a precipitous and difficult country for their application.

In the paper on the "Rôle of the Igneous Rocks, etc.," in one place I was endeavoring to show that where several sets of different veins are found in a district and have contrasted vein-filling, they are difficult to explain by the hypothesis of lateral secretion even in its extended sense. The passage which is the main cause of Mr. Purington's criticism is as follows:

"The Sequence of Vein-Formations.—There are also cases of successive and contrasted vein-formation. More than fifteen years ago R. C. Hills recognized three sets of veins in the San Juan region of Colorado, each with different ores; and the recent work on the Telluride quadrangle of the U. S. Geological Survey has shown in detail many of the structural relations.* There are in this district four sets of fissures, but only one carries the ores,—a remarkable state of things if the ores are due to the universal circulation of the groundwater. In one instance, the Smuggler vein is faulted by the Pandora, a later vein which does not carry ores sufficiently rich to be mined profitably."

The subsequent comments given in the next paragraph but one, upon this and other illustrations so far from being extravagant, seem to me after the lapse of two years to be exceptionally temperate and guarded.

In the passage above quoted there seems to be no doubt that the phenomena cited by Mr. Hills are in the San Juan region and really exist, and are pertinent to my argument. The reference to Mr. Purington's paper is based especially upon the following passages on page 767. After setting forth the compass bearings of the fissures, he states: "From the foregoing it is evident that there are four general directions of fissuring, (1) east and west, (2) northeast, best developed in the central and southeastern portions of the quadrangle, and (3) north and south, and (4) northwesterly, best exemplified in the northeastern portion."

A few lines above this paragraph in speaking in detail of the fourth or northwesterly group of fissures, he states, "This group is of the most interest from an economic standpoint as will be set forth under the heading 'The Veins.'" Thus it is evident that when I stated that in the Telluride quadrangle there were "four sets of fissures, but only one carried the ores," my statements were too sweeping and were loose and inaccurate, because in other portions of the quadrangle others of the fissures than the northwestern series are the basis of some of the less important mines, as Mr. Purington's paper makes clear.

The Smuggler and two or three parallel veins are faulted by the Pandora, and the ore in the Pandora is different from the ores in the thrown veins as Mr. Purington states on page 779. My remark about the

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[1] W. O. Crosby and M. L. Fuller, "Origin of Pegmatite, *American Geologist*, March, 1897. The paper is reprinted from the *Technology Quarterly*, December, 1896.

[2] G. H. Williams, "General Relations of the Granitic Rocks in the Middle Atlantic Piedmont Plateau," 15 Ann. Rep. U. S. Geol. Survey, 675.

*See C. W. Purington, 18th Ann. Rept. U. S. Geol. Surv., Part iii, p. 745.

Pandora was that it "does not carry ores sufficiently rich to be mined profitably." Mr. Purington's words on page 834 are, "No remunerative values have, so far as has been ascertained, been found in the Pandora vein."

I trust that in this statement I have made such acknowledgment as the instance demands, for I am anxious to do so amply. Nevertheless with the correction rigidly applied the case will furnish an excellent and perfectly justifiable illustration of the point for which it was first employed. We have four great series of fissures with the greater number of productive mines and practically all those in the northeastern portion of a large quadrangle, along one set. A later, and so far as was known at the time, an unremunerative vein, the Pandora, faults the Smuggler, which is older and which has been very productive. Even if, in an adjacent quadrangle and two miles away, as has been suggested by Mr. Ransome, the very rich Camp Bird mine is on the Pandora fissure, the case is not essentially altered for the purpose for which I used it, and I repeat that my remarks upon it and upon others of similar nature were temperate and guarded.

The gist of the whole matter turns, however, upon the use of citations, and against the practice Mr. Purington directs his heaviest attack. But it seems to me that in this, as in most other matters, good, common sense should be exercised. If a writer were at this day to advance some such "high-worded" theory as that the influence of the moon was potent in the formation of ore-deposits and were to support it by citations from the writers of Agricola's time or earlier, he would be open to deserved censure. But if on the other hand he were to present a sane and temperate thesis or were emphasizing certain aspects of a discussion—said aspects not being appreciated at their proper importance by the contributions most read and trusted at the time—he would be perfectly justified in citing in his support the observations of any or all of those mining engineers and geologists who are known to be careful and accurate in their work. Among the papers contributed by such observers there is none in my opinion which deserves quotation more than Mr. Purington's report upon the Telluride quadrangle. In my view it is not prohibitive if the citer has not visited the region studied by the "citee," the force of the reference depending upon the reputation of the latter and the appropriateness of the case. I will not hesitate to maintain—always provided the thesis is reasonable—that it is the citer's duty to bring out the cases in order to properly present the full evidence to his readers, and to show that he has made his paper a subject of thorough and exact scholarship. Even Mr. Purington himself, cannot refrain from using such citations when they fortify his point, as the Demerara instance, page 83, illustrates.

I submit in closing, therefore, that except so far as Mr. Purington has a case against me of somewhat loose quotation of his paper, which I do not hesitate to acknowledge and regret, there is but limited force in his closing paragraphs. J. F. KEMP.

New York, August 25, 1903.

THE CANANEA ORE DEPOSITS.

The Editor:

Sir.—Mr. W. L. Austin has contributed to the JOURNAL a very interesting account of the Cananea copper deposits which may well inspire other engineers to follow his example. In this paper he is good enough to refer several times to a brief account published by me as a result of a short and hurried visit to this interesting camp. It appears that Mr. Austin must have read my paper on "Ore Deposits Near Igneous Contacts" somewhat hastily, and to have missed the fuller account of the geology of the Cananea in my earlier paper, "Notes on Certain Mines in the States of Chihuahua, Sinaloa and Sonora, Mexico." The facts as I have there outlined them in no way disagree with Mr. Austin's observations. I have described in some detail the great productive ore bodies of the camp as occurring in fractures crossing porphyry and quartzites of the district. It is evident, however, that my selection of the name Cananea for the type of contact metamorphic deposit found to be very common throughout this district and developed particularly at the Cananea mine has led to a misunderstanding on his part. Such deposits are not as yet great producers, but in the future are likely to become so, here, as they are in British Columbia. Inasmuch as neither the observations nor the deductions presented by Mr. Austin apply to these deposits, but are based upon his study of the structurally and probably genetically different deposits in porphyry, I see no reason to doubt the theoretical inference formerly presented that if the theory of origin presented be correct, the contact metamorphic deposits may extend downward to the granular rock.

As the subject is one of considerable interest, and the district of prominence, I may be permitted to add a brief account of its leading features. The great producing mines of the district are on the mountain slopes about 1½ miles west of the smelter. These deposits are not of contact metamorphic origin as the term is generally used. Between these deposits and the smelter there is a belt of highly altered sedimentary rock, containing several copper "veins," which are recognizably altered and impregnated sedimentaries. The northern group of mines, at Puertecitos, is seven miles from the smelter. At this place the Cananea mine shows typical contact metamorphic deposits, and in this vicinity and for several miles south of it on both sides of the mountains, the altered sediments are the most resistant rocks and prominent features of the landscape. This series contains many cupriferous layers and the outcrops have been repeatedly sampled and are explored by numerous tunnels. In view of these facts the selection of the Cananea deposit as typical of contact metamorphism does not seem to me to be ill advised, though possibly emphasis should have been laid upon the fact that it is not the deposits of this type, but those in fractured porphyries, which have yielded so large a production of copper. These latter I have defined as "deposits formed in fractures along and across the porphyry and quartzite without any definite relation to the igneous contact. Near the Ronquillo smelter of the Greene Consolidated Copper Company the ore-bodies of the group of mines embracing the Capote, Veta Grande, Cobre Grande, and Oversight properties, occur mainly along these fractures."[1]

In my earlier paper, I described the Capote ore-body as follows: "The Capote ore-body consists of a mass of crushed porphyry altered to a white, clayey material, and carrying scarf-like masses, strings and bunches of soft black copper glance, with some residual pyrite. The southwest and southeast parts of the ore-body consist of a shattered mass of quartzite, whose joints, fissures and interstices are filled by ore. This crushed material has all the characters of an interfault mass, but no boundary fault-slips were observed; and where the boundary of the ore was seen, the transition to solid and lean quartzite or pyritized porphyry was very abrupt. The evidences that the glance is of secondary origin are clear and conclusive, both in the faces seen in the mine and in thin sections of the ore, where the disseminated pyrite grains (of an altered porphyry, forming a dike in the quartzite of the ore-body) are partly replaced by glance. The ore-body is very large, measuring 275 ft. by 135 ft. on the 100-ft. level, and 165 ft. by 100 ft. on the 200-ft. level. The ore is soft, as much of the porphyry is rotted, and heavy timbers in square sets are used, and the space filled with waste, as in the Butte practice. Much of the ore will run 15 per cent, as mined. In the rock-cuts along the narrow-gauge railway the true nature of several of the lesser veins is recognizable as altered strata impregnated with chalcopyrite, with small amounts of galena and blende."[2]

Mr. Austin's paper is so evidently the result of a careful, conscientious examination, that one may not question his facts. It is, however, permissible to call attention to his conclusion that the pyritic minerals of the "main ore deposits" "brought up by the porphyry" became through magmatic differentiation more concentrated in certain localities than others. The surface exposures, ore dumps and thin sections of rocks and ores all show intense solfataric alteration of the porphyry, and prove the secondary origin of the pyrite.

I entirely agree with the conclusion that "There are contact metamorphic deposits at La Cananea, and that they were of comparatively subordinate importance in connection with the output of copper in 1901, and they are still subordinate."

WALTER HARVEY WEED.

Washington, D. C., Sept. 2, 1903.

[1] "Ore Deposits near Igneous Contacts," p. 14.

[2] "Notes on Certain Mines in the States of Chihuahua, Sinaloa and Sonora, Mexico," p. 38. 1902.

The Editor:

Sir.—In Mr. Austin's paper on the ore deposits of Cananea, published in the issue of August 29, he says, in speaking of the Capote mine: "One peculiarity of the low-grade ore bodies is, that although the rock may have lost its pristine character and may be as soft as stiff putty, the pyrite distributed through it is unoxidized and bright, even on its surface."

In order to contribute data which may lead to a correct diagnosis of the genesis of ore deposits, which Mr. Austin, in the same paper, says is of more than scientific interest, I will add some observations of mine.

The most striking peculiarity marking the low-grade Capote ore is that nearly all of the pyrite is coated with a microscopically thin film of chalcocite, which extends even to the planes of fracture. And on breaking a piece down to the most minute particles, at least one of the small new faces exposed is seen to be similarly coated.

This peculiarity affords the clearest evidence that I have yet had an opportunity of observing of the secondary character of chalcocite.

MARTIN SCHWERIN.

New York, Sept. 4, 1903.

MINE VALUATION.

The Editor:

Sir.—May it not be possible to have a mine with too much ore in sight? I ask this question because the general tenor of the discussion on mine valuation has made ore in sight the crucial test of the value of a property.

If based on this test, many of our good iron mines would make a sorry showing, and yet their capacity for production is well known and year after year they come up to expectation. If one has a fairly regular deposit, is anything to be gained by rushing the openings so that 10 or 20 years' supply of ore is opened up? Will not the interest charges on the cost of this development, the expense of re-timbering the openings and the pumping charges be a heavy drain on the income?

In Butte to-day litigation has forced development to such excess that it is estimated that certain drifts will have to be re-timbered four times before the ore is stoped. Several of the prominent Lake Superior copper mines have ground opened up many years in advance with but questionable benefit, as the drifts driven every 100 ft. do not show the full width of the lode and the rock from these openings has not been stamped by itself, so as to show its yield. Cutting out stopes every 300 ft. would at least have been cheaper and have given more idea of the yield to be expected.

The president of a prominent western railway boasted that he had just added to the company's coal-land holdings a 90 years' supply. A little figuring showed him that the interest on his investment would make his coal 90 years hence pretty expensive.

A few years ago Prof. Robert Peele, Dr. John H. Banks and myself were required to place a valuation on four pyrite mines for a proposed consolidation.

They were in various stages of development and one of them had more ore in sight than the combined tonnage of the other three. This large tonnage left in the mine consisted of ore which in the earlier days would have produced fines then of little value. At the time of the examination the development of mechanical roasting furnaces had placed fines on a par with lump, and this ore was now available for extraction. The question arose what value was to be given to this ore in sight. I quote from our report:

"We have taken the ground that in mines of this character the deposits are so regular that the better test of their relative values is to be found in their capacity for production per 100 ft. of depth, rather than in the number of tons of ore available for immediate shipment; that is, 'in sight.' Taking as we do this view, we desire to minimize the effect produced on the value of each mine by the varying amounts of ore in sight, believing, for example, that by sinking B mine and C mine each about 200 ft., and running the necessary drifts, we would have in each of these mines an amount of ore in sight equal to that at A mine. This result would be accomplished by the expenditure of a comparatively small amount of money in each case, which would be charged to development."

Following this line of reasoning, and attempting perhaps the rather difficult task of "giving mathematical exactness to phenomena governed by the complex laws of nature," we evolved the following formula:

$V = 5\,ax + by + c$, in which—

V = Value of the mine.
a = Net profit per ton of ore mined.
x = Annual estimated output in tons.
b = Cost of development per ton of ore opened up.
y = Tonnage of ore in sight above the bottom level.
c = Value of the equipment and stocks on hand.

In the above formula it will be seen that the practical valuation of the mine was assumed at five times the annual profit. The figures substituted in the above formula for the four mines were as follows:

	a	x Tons.	b	y Tons.	c	V
A.....	$0.84	96,500	$0.062	293,000	$97,100	$520,566
B.....	0.94	120,500	0.058	88,800	115,400	686,900
C.....	1.15	79,500	0.100	117,200	67,650	536,495
D.....	0.91	15,000	0.150	63,000	35,100	112,800

Some three years later I had almost the same problem in a group of copper-silver-gold properties in a western State which it was proposed to consolidate, as the various ores, with the addition of a little limestone, would make a most economical smelting mixture. In this problem the copper mines E and H were well opened up, while the two silicious gold and silver mines F and G had not the openings and development that proper mining would demand. The bottoms looked fairly well and the past records were good, but no such assurance of "future performance" was to be counted on as in the regular pyrite mines previously described.

From the data available the following figures were compiled:

	$ay + c$	ax	Owner's price.
E.....	$800,000	$284,375	$6,000,000
F.....	128,000	112,000	250,000
G.....	866,000	630,000	3,200,000
H.....	600,000	175,000	750,000
	$2,394,000	$1,201,375	$10,200,000

In the above $ay + c$ represented the profit in sight, the tonnage in sight y being multiplied by the estimated profit per ton a, instead of by b, as in the pyrite mines.

The figures ax were only tentative in this case, and would have to be used as a guide only.

The scheme of consolidation was never carried out on account of the high valuation placed upon their properties by the owners of E and G. The owners of E wanted 60 per cent of the consolidated stock, while they had but 33 per cent of the total value in sight and were capable of contributing only 25 per cent of the earnings. The owners of G were not unreasonable in their demands, were it not for the fact that their future was doubtful and with only a little over one year's ore in sight they were demanding a five years' purchase.

Had the decision been in my hands I would have consolidated on the following basis: E, $2,000,000; F, $250,000; G, $2,000,000; H, $750,000; total, $5,000,000.

I give these two cases, the first showing the extreme limit in which "profit in sight" is almost negligible. The other limit in which "profit in sight" is a *sine qua non* has been gone into most thoroughly by your previous contributors. My second case is a mean between the two; and in estimating the value of a property either as an arbiter or for a purchaser the engineer must integrate his equation between the two limits. Buying a mine on the basis of "profit in sight" is much like dealing in pork or dry goods, and needs not the services of a trained engineer as much as it does careful, plodding samplers and assayers.

What I wish to bring home to the engineer examining properties for an investor is the point that his client's greater profits are not to be made from the purchase of those properties where the "profit in sight" is so great, but from those which the engineer's judgment tells him will improve with development. As the late Marcus Daly said to one of his men who had spent two years in fruitless search for a mine, "Why the devil don't you get reckless once in a while and spend forty or fifty thousand dollars?"

J. PARKE CHANNING.

New York, Sept. 2, 1903.

TROUBLES IN CYANIDATION.

The Editor:

Sir.—In the JOURNAL of August 15, Mr. J. W. Mercer refers to the difficulty encountered at his company's mines in Ecuador, in the precipitation of gold in the zinc-boxes, owing to the zinc becoming inert after a time, and giving a very low-grade product.

Some years ago the writer encountered the same trouble in cyaniding some arrastra tailings which contained copper and quicksilver in such quantities as to interfere very materially with precipitation. The zinc shavings, which were furnished me by the MacArthur-Forrest agency in San Francisco, remained still wiry and became inert before they were half-consumed by the solution, or had precipitated any large amount of gold.

The difficulty was overcome by securing, from the Denver office of the cyanide company, a very thin "flossy" zinc shaving, which, although not entirely eaten up by the gold solution, gave very satisfactory results and a fairly high-grade product.

Evidently, in such cases, the action of the solution is stopped by accumulation of precipitate on the surface of the zinc; and the thickness of the shaving should not be over twice the depth to which the chemical action reaches.

M. A. KNAPP.

Barranca de Cobre, Chihuahua, Aug. 23, 1903.

AMERICAN GOLD MINES.*

By J. H. CURLE.

A few weeks ago the Esperanza, a Mexican mine adjoining the El Oro, was floated in London and New York, with a capital of £455,000. This is a producing mine with 120 stamps; it owns a section of El Oro lode, where that lode runs up to as much as 60 ft. in width. It is a splendidly managed mine, and is now earning profits at the rate of about 20 per cent on its capital. The surface equipment is very fine.

But the notable point about the Esperanza is its profit in sight. This is stated by Mr. Hays Hammond, whose agents sampled the mine, and who is responsible for its purchase from its Mexican owners, to be equal to 75 per cent of its issued capital; in addition to this the deepest workings are in ore of great width and of good value. These facts, so far as I am any judge, show the Esperanza to be the fairest flotation ever put on the London market; for I have never before known a mine to be placed before the public *at par*, when the profit in sight at the time (to say nothing of the prospects in depth) so nearly approached the issued capital. A little over a year ago the Camp Bird was floated, with 60 per cent of its issued capital in sight as profit. That was a sound basis of flotation, as compared with the African or Australian gamble that is usually put before the public, and set up as definite standard of valuation for future reference. This standard of valuation shows the Esperanza to be a still fairer venture than Camp Bird was at the date of its flotation, and I hope it may be referred to for all mining flotations in the future.

It will be noted that these two genuine and sound flotations, which are on such a fair basis as to be recommended as the standards for all future mine flotations, are both American mines, and the reader will probably arrive at the conclusion that American gold mines are reaching a sounder basis than used to be the case. They are, most decidedly. In Alaska Treadwell, El Oro, Esperanza, Camp Bird, and Tomboy we have as fine a group of mines as any country is able to show. These are, of course, only a fraction of the mines in the States and Mexico, but they are the principal mines there owned by British capital. American capitalists develop and work many of the mines privately. They understand their business, and by handling their mines in the proper way, that is to say, on a basis of *net profit in sight*, are generally able to do very well. They are advised by the finest mining talent in the world, for compared to the Americans, we British are deeply lacking in mining knowledge. The American is supreme as a judge of a mine—as a mine valuer he is infinitely practical. The Englishman worries about details. The American knows that all such trifles must give way to one great fact, the *profit in sight*. If that is sufficient, he has something on which to base his fabric, and then only he will attend to the details. If it is not sufficient, he has no time to waste on a third-rate mine, and he leaves it for someone else. It can be seen, then, that when this class of man gets hold of the right mine, when he sees that the ore is actually there, and that the property is probably capable of great expansion, he gets to work in earnest. He always has his eye on the main thing though, the ore reserves, and under his management they keep ever growing. All this splendid, practical work bears fruit. The mines handled by these men become the ideal mines to invest in, for they have such huge ore reserves. All the mines I have mentioned have years and years of reserves. Within the last few weeks I have revisited El Oro, Esperanza, Camp Bird and Tomboy; between them they have at this moment considerably over 2,000,000 tons of ore blocked out. El Oro has 1,000,000 tons in sight, and when its second 100 stamps are erected will have six or seven years' ore blocked out. Esperanza has 400,000 tons, with a lode 60 ft. wide in the bottom level of the main workings. Camp Bird has over four years' ore blocked out, and is increasing its reserves rapidly.

Tomboy needs special mention. This is no doubt a low-grade mine, but it is certainly going to be one of the biggest mines in America. From what I saw, I believe another hundred stamps can be put up, and I should not be surprised if by the time these are ready there are a million tons of ore reserves! Two years hence this will be a notable mine.

I am, then, distinctly in favor of these American mines. They are superbly handled; they are well directed from this end; they have large and ever-growing ore reserves, and they pay good dividends. Mining is not all a gamble; there is some soundness about it. While Africa is living on its capital, and the speculative world of mining is dried up and withered, the investor might do worse than lay out his money to receive from 10 to 20 per cent interest. And with this end in view I draw his attention to these American gold mines.

*From the London *Economist*, August 29.

ACROSS THE SAN JUAN MOUNTAINS.

By T. A. Rickard.

(*Continued from page 346.*)

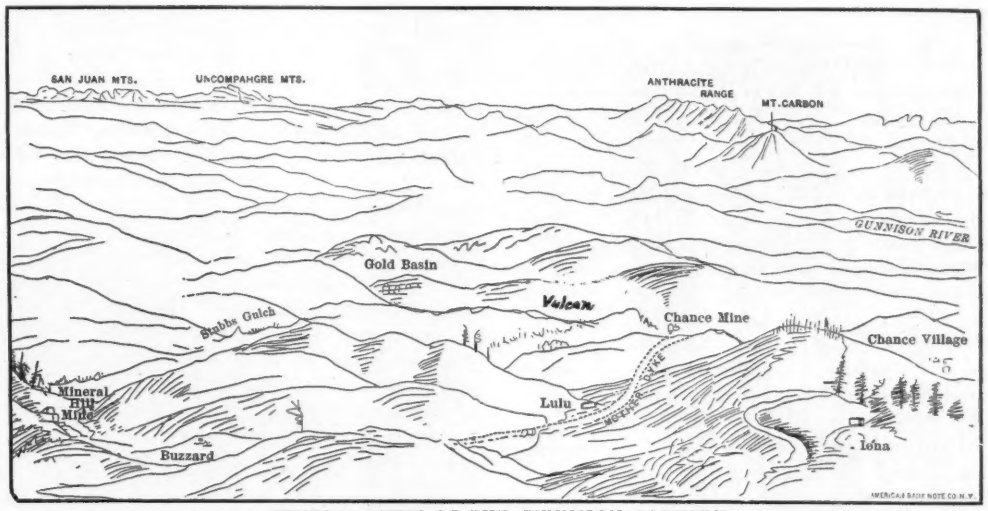
At the top of Slumgullion gulch the road turns eastward to Creede; we turned northward and, picking up a trail which plunged into a pine forest, we eventfully found ourselves at the headwaters of the Cebolla and followed it down. We were soon on a well-beaten path—the old Ute trail, used by the Indians in their migrations across the Gunnison country. They are gone from these hills and huddled on the reservation, so also the game which they hunted; that too has been driven away by the restless prospector. As we rode along in single file there was no sign of living thing for hours of travel; we followed the Cebolla, fringed with willows and threading narrow valleys overshadowed by cliffs of architectural aspect, battlemented masses and monumental pillars, like Egyptian pilons, among which the babbling trout-stream took its quiet way. The mountain flanks appeared to be built of rhyolite and rhyolite breccia. Occasional fragments of obsidian were found. Later we were in a granite country.

While picking our way over the talus at the foot of high cliffs and noting the general air of destruction which had characterized much of the rock structure seen during this particular morning's ride, it was impressed upon the observer that frost action was very apparent. To most people who travel among mountains and even to those who live at their feet it is often a wonder how the rocks are broken, and when? Anyone who sleeps outdoors will note the fall of rock fragments during the night and to this fact, I think, is due the general immunity from such danger. The patient leverage of the frost is the chief agent in disintegrating the rocks, for, the maximum density of water being at 4° C. or 39° F., one of the most powerful of nature's silent forces is set to work upon the water, which, having sought out the cracks and crannies of the rocks, is in the act of expanding. By day the temperature in the high mountain country is raised by reason of the penetration of sunlight through the clear atmosphere, but at the approach of night there is a sudden cold, which is succeeded next day by another relaxation. During these variations of temperature the moisture in the rock-cleavages undergoes an alternation of contraction and expansion which serves as an intensely powerful agent of disintegration.

VULCAN, COLORADO.

At noon we pulled up at a spot marked in large letters on the map as "Cathedral" and found a solitary log cabin with a hospitable woman in command, who gave us dinner. Subsequently, when smoking a soothing pipe, we could appreciate the simple grandeur of the granite forms, sculptured by Time and chiseled by the heat of day and the frost of night into buttresses and pinnacles simulating all the stern magnificence of a Gothic ruin—of a cathedral not made with hands, domed by the sky and aisled with the green of the peaceful valley.

All of the succeeding afternoon was spent in a comfortable ride down the expanding valley of the Cebolla, which now began to exhibit cultivation, until, with a long gallop through the cool air of the twilight, we reached the Hot Springs. Here we put up overnight. From a distance the patches of white encrustation and clouds of steam told us of our approach to this scene of thermal activity. The links between vein-formation and hot springs which are to be seen throughout this region are not lacking in suggestion. The mining districts of the Rocky Mountains are rich in hot springs. In Colorado there are Hot Sulphur, Idaho Springs, Manitou, Cañon City, Glenwood, Poncha, Wagon Wheel Gap, Pagosa, Trimble Springs, Ouray and others of less importance. Similar conditions obtain in the States of Idaho, Montana, Utah, etc. The occurrence of these thermal springs, rich in alkaline and other salts, in the midst of a very productive mineral region, is not without significance. Apart from their scientific aspect the Hot Springs play a useful part in the economy of man. They are the resort of people troubled with ailments requiring rest and change of food; to the miners, who come to them with rheumatism, indigestion, alcoholism and similar troubles they are beneficial, chiefly by reason of the opportunities for cleanliness, abstinence and a simple diet—the last, to my mind, the especial boon of the thermal spring resort, because the miner lives in a world of sin and canned vegetables from which "ranch food" and early hours of sleep will rescue him, bringing his inner man to a condition of normal healthiness.



GENERAL VIEW OF THE GUNNISON COUNTRY.
(After Prof. Arthur Lakes).

Next morning, September 13, we turned eastward from the Cebolla valley and struck across country for Vulcan. At the foot of a high ridge we passed the Old Lot mine, cheerfully active. The dump indicated a vein carrying two or three feet of dark quartz streaked with galena. Close to the latter occasional spots of native gold could be seen—a handsome-looking ore. On the top of the ridge there was afforded an extensive view of the Gunnison plateau, bounded to the north by the Gunnison river and to the south by the serrated ranges of the San Juan mountains. The accompanying sketch is borrowed from Professor Lakes.[1] It is looking west and gives a good idea of the general appearance of this part of Colorado, so unlike, in its treeless hummocky tameness, to the grandly picturesque mountain-land from which we had emerged the day before. The billowy succession of rounded hills is built up of Archean granite and Algonkian schists. We saw several outcrops of the latter, especially in the Vulcan district. Flows of Tertiary lava and layers of breccia form occasional flat-topped ridges with broken edges and tumbled talus slopes. The occurrence of an area of schist is an interesting feature, because while there are other stretches of these rocks, represented by the actinolite schists of the Arkansas valley and the hornblende schists of the western slope of the Langre de Cristo, this particular rock is unusual to the mining regions of Colorado, and is not regarded as a favorable terrain for precious metal mining, a fact which is in striking contrast to California, South Dakota and other very productive regions.

On arrival at Vulcan we proceeded at once to the Good Hope mine, owned by Dr. Loui Weiss and others, who invited us most cordially to see the workings. This we did very gladly because the mine was well known as having been the source of the handsome specimens of native tellurium which are to be found in many mineral collections; furthermore, I had heard of several peculiarities of lode-structure which aroused curiosity.

The Good Hope vein penetrates a greenish gray sericite or hydrous mica schist, which has the greasy

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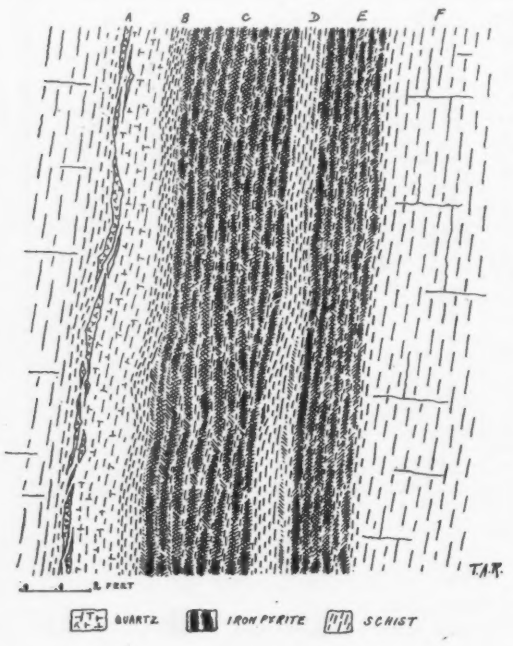
[1] *Transactions* American Institute of Mining Engineers. Vol. XXVI., page 442.

feel and fine texture characteristic of that rock. It forms part of the Algonkian series of crystalline schists which overlie the Archean granite of the Gunnison plateau. The vein has an approximately East and West strike; it dips northward, the hade being 40 ft. in 500 ft. At surface the vein has an outcrop of heavy iron sinter which eventually gives place underground to a band of country thickly impregnated with iron pyrite. The walls of the vein are smooth and soft, both features being due to a parallelism with the schistosity of the enclosing country. No selvage or casing was noticed, but the lode-matter breaks rather readily away from the country on account of a blocky jointing, which, added to the fissile character of the rock itself, makes mining operations dangerous unless the timbering is well attended to. The rich ore is associated with streaks and lenses of iron-stained schist traversed by stringers of quartz. Native tellurium is frequently present, but the mineral which carries the gold has not been detected with certainty. I found some spots of petzite, and it is likely that this is one of the enriching minerals.



GOOD HOPE MINE.

FIG. 7.

The accompanying sketch (Fig. 7) of the lode, as seen at the fifth level, will illustrate its structure. From A to B is the main pay-streak. On the hanging wall there is 3 to 5 in. of quartz, usually iron-stained; then comes a bleached decomposed schist carrying a little quartz throughout. It is this white silky schist which usually carries the telluride minerals. The band B is soft white schist. C is 3 feet wide and consists of massive granular-crystalline iron pyrite in finely shaded bands which reproduce the lamination of the schist. D is another band of bleached schist. E is similar to C, but not so solid. The enclosing country also carries a scattering of pyrite.

In the upper levels there is evidence concerning the origin of the vein and its contents. The occurrence of a body of native sulphur has been emphasized practically, by its combustion to an extent that endangered the mine. The adjoining ground in the Chimney and Vulcan claims was abandoned on account of the burning of a similar body of sulphur. In the Good Hope there is a body of it 105 ft. deep, 4 to 6 ft. wide and of a length which the owners thought it unwise to determine by further drifting. The top of the sulphur very nearly coincided with the first level, 90 ft. from the surface. This substance, occurring as a grayish yellow loosely coherent powder, was shipped in car-load lots to the Western Chemical Company, at Denver. It averaged 80 per cent sulphur and also 3 to 20 dwt. of gold per ton. The water of the mines on this vein is very acid and green in color. It carries over 1 per cent copper and 1.5 per cent of sulphuric and sulphurous acids.

On inquiry I was given the analysis of the water from the shaft on August 15, 1901:

	Per Cent.
Sodium chloride	0.82
Sodium sulphate	3.59
Calcium sulphate	4.35
Calcium carbonate	4.61
Magnesium carbonate	6.52
Silica	0.23
Organic and volatile matter	3.67

The water contained no free H_2SO_4, or at most a trace; there was only a trace of copper. It is the opinion of Dr. Weiss that the sulphuric acid and copper now found in the mine water come from the adjoining Vulcan ground and are traceable to the effects of the burning of the native sulphur which lasted for two weeks in the neighboring Vulcan and Mammoth-Chimney workings. There was no acid nor copper in the water from the Good Hope shaft until after the fire, and it is probable that surface waters have since then percolated through the Vulcan workings and thence downward to the fifth level of the Good Hope, which is 100 ft. deeper than the Vulcan shaft. Apart from this fact, it is worth noting that the copper in the Good Hope ore is increasing in amount with depth, specimens of the native metal having been found in the quartz from the lowest level.

At the first level there is evidence that the vein was shattered and that a certain part of it, at least,

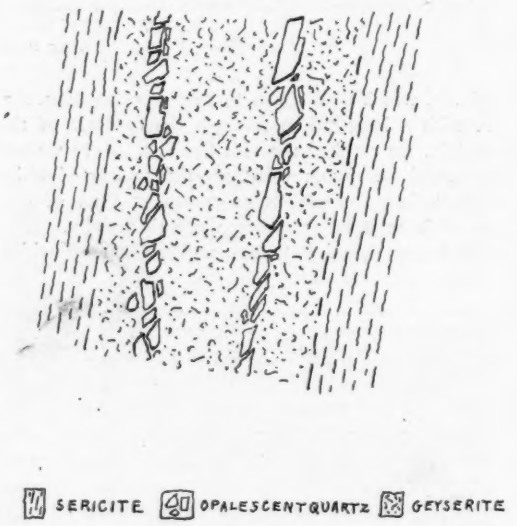


FIG. 8.

served as the vent for a thermal spring of comparatively recent date. Figs. 8 and 9 were taken, the first within 100 ft. of the shaft and the other further eastward. They exhibit the shattering of a vein of opalescent quartz and the filling of the vein-fracture with geyserite, for a width of 4 to 5 ft. The substance, which is here termed "geyserite," has a specific gravity of 1.96 to 2. It is porous, with scattered bits of opal within a mass of grayish-white crumbly hard non-crystalline silica. On comparing it with a piece of geyserite from the Yellowstone, the identity was apparent. The banded opalescent quartz so abundant in the upper part of the vein has all the characteristics of such a substance when deposited from thermal springs, and it occurs in the Good Hope vein in various stages of hardness and texture. Fire-opal is to be seen in occasional brilliant specks, and all sorts of dark jasperoid quartz are found, beautifully banded.

The gradation from geyserite to white sericite schist indicates that the latter contributed toward the material now occupying the vein fracture, and the occurrence amid the siliceous sinter of occasional dabs of a very smooth unctuous white powder suggests remnants of the mica which characterizes the enclosing country.

These facts point irresistibly to the activity of thermal waters, that is, waters having a temperature higher than the mean annual temperature at the surface. Geyser action has, so Dr. Weiss tells me, been quoted in this connection by other visitors to the mine, but a geyser is a thermal spring which gushes[2] out at the surface, and in this case we have no reason to suppose that such action occurred. Geysers are apt to be the last resort of a perplexed geologist. The supposition of thermal activity is based on the occurrence, in the vein, of substances which are actually deposited from the hot springs in the Yellowstone and other places.

In connection with this occurrence it is well to refer to the evidence of vein formation at hot springs which Mr. Walter H. Weed observed at Boulder, in Montana.[3] At that hydropathic establishment there are two groups of hot springs, issuing from fractures in the granite and having a temperature ranging from 120° to 164°. These waters do not form a surface deposit of sinter, but the fissures from which they issue are found to contain a mineral deposit. Many of the fissures have been sealed up with this deposit so as to form veins, the outcrops of which enable one to trace their course across the country. The vein-filling consists of a white or dark gray material which is mainly a mixture of chalcedony and stilbite, but also contains patches and bands of jasper, as well as included fragments of the granitic country. The illustrations given by Weed resemble the structure to be seen in the first level of the Good Hope mine. Opaline silica, in bands and curly layers, is seen throughout the mass. When freshly fractured it is usually dark gray and very hard.[4] The surrounding surface shows scattered fragments of jasper, chalcedony and other substances evidently derived from these deposits. On analysis they were found to contain an appreciable amount of gold, as much as 0.05 oz., and silver, as much as 0.04 oz.,[5] so that the connection between ore formation and thermal activity is manifest. It is interesting to note that the author does not impute the source of the heat to "unknown depths," but to meteoric origin as "a part of the normal underground circulating water of the region, heated by physical conditions giving it access to the still hot rocks underneath."[6]

It would seem[7] that the Good Hope vein existed as a pyritic band in the schist, formed by the action of feebly active underground waters such as, with extreme patience and slowness, are supposed to form similar lodes. Long duration of time for action and

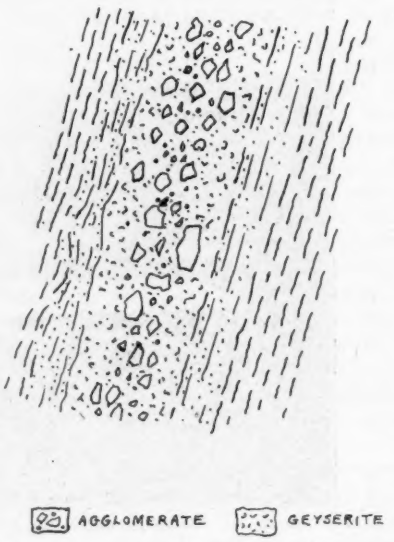


FIG. 9.

immense volume of solution compensate for feeble chemical activity and extreme dilution. The for-

[2]Geyser is an Icelandic word, meaning literally "a gusher."

[3]"Mineral Vein Formation at Boulder Hot Springs, Montana," by Walter Harvey Weed, United States Geological Survey, 1900.

[4]Op. Cit. Page 241.

[5]Op. Cit. Page 248.

[6]Op. Cit. Page 250.

[7]The reader is reminded that these data were gathered during a visit of a couple of hours while on a horseback reconnaisance across the country, so that the writer's explanation of the origin of the vein is only a suggestion, prompted by the interesting features which have been briefly sketched.

mation of the fracture occupied by the vein and the circulation of underground waters which supervened may both have come in the wake of dying volcanic energies such as were manifested in the adjoining region of the San Juan mountains.

At a later date, after the Good Hope vein had been formed, it became the line for a repetition of fracturing along which more intense thermal activity had play. A part of the vein served as a vent for a hot spring. This shattered the pre-existing vein and led to the decomposition of the pyrite,[8] with the elimination of sulphuric acid, the formation of an iron sinter and the accumulation of a large mass of native sulphur. It is also probable that the liberation of iron salts, such as the proto-sulphate, afforded solvents for the gold which was re-deposited in the lower parts of the vein so as to make valuable ore.

The Good Hope vein is rich in uncommon minerals. Tellurium occurs native, as a tin-white mineral with a metallic luster.[9] Occasional specimens exhibit rhombohedral prisms. It is associated with petzite, the telluride of gold and silver, and a new mineral, the telluride of copper.[10] A greenish-brown micaceous substance suggests roscoelite, a vanadium mica, which occurs in association with telluride gold ores in Boulder County and at Cripple Creek, Colorado, as well as at Kalgoorlie, West Australia. One specimen, secured on the occasion of our visit to the mine, contained fine needles of berthierite, a sulph-antimonite of iron, which bears some resemblance to stibnite. The opal of the upper levels is said to have been very rich, especially in the purple-tinted spots; this may have been due to a telluride salt. The distribution of the tellurides, together with the native element itself, is another suggestion of the instability of these compounds in nature. So far as is known they are not characteristic of very deep mining, but are more especially distinctive of that bonanza zone of gold lodes which is measurable from the surface and appears to be connected in origin with the conditions obtaining at the groundwater level. Of course, "depth" is a relative term, and in this connection refers rather to the vertical distance from the lower limit of oxidation.

(To be continued.)

[8]The compact pyrite of the lower levels and the sulphur of the upper workings is connected in origin by an intermediate body of loose, sandy pyrite, which was, at one time, as dangerous as a quicksand to the miners. This is referred to by Professor Arthur Lakes, in a "Sketch of a Portion of the Gunnison Gold Belt." *Transactions* American Institute of Mining Engineers, Vol. XXVI., pp. 440-448, and especially page 448.

[9]Tellurium is not a metal, but an acid element, having a metallic luster.

[10]The composition of this mineral is Cu 40.74, Te 59.21 per cent. It was described in THE ENGINEERING AND MINING JOURNAL of January 17, 1903.

VUG AND RESUE.

By R. ARTHUR THOMAS.

In response to the inquiry of the Editor of the ENGINEERING AND MINING JOURNAL, the writer takes pleasure in giving the result of investigations made by him with a view to determining the origin and correct spelling of two useful Cornish mining terms, which were submitted to him under the form of 'vug' and 'resue.'

Regarding the first, Mr. Rickard defines 'vug' as "a natural cavity in a vein; it is usually restricted to small cavities as distinguished from cavernous openings." In an old Cornish dictionary there occurs "Voog, Vooga—Smoke." In Cornwall hollow caverns in the earth or in mines, and those made by the fretting of the sea, are described by the word 'vooga.'

Pryce in his "Mineralogia Cornubiensis" says pretty much the same, and gives "Vou—Hole, from Vau or Vauw, a natural cavity, hole, or chasm in the earth or mine."

The writer is under the impression that this word Vug is a corruption of the Welsh, derived possibly from the original Cornish word for Smoke or Place for Smoke. In the following modern Welsh sentence, with its translation, there is the suggestion of such a connection:

"Y lle hwn sydd lawn o fŵg (or fw-wg)."
"This place is full of smoke."

The word may mean the "Cavity as a Place for Smoke" or where smoke existed. Compare this with the extract from the Cornish dictionary. The well-known close resemblance between the Welsh and Cornish languages is a fact which must not be overlooked.

The correct Cornish spelling should probably be voog or vooga, especially when it is considered that the Welsh w (as formerly also the Cornish) sounds like oo in English, as in fŵd, food, or gŵd, good. The word voog or vooga in the old Cornish seems to mean cave or cavity, and may have

BURRO TRAIN CROSSING A ROCK-SLIDE.

also meant a place for smoke, and was no doubt applied generally to any hole or closed passage in the ground or rock.

It is interesting to notice how aptly most of the old Cornish names embody some special feature in the locality to which they apply. For instance, "Trevaunance"—the place of the cave valley—from the old mine workings which it has unwatered time immemorial; and "Trevu," the late Dr. Smith's place at Camborne, may owe its name to a similar origin, from an adit formerly in existence there. Note the extract from Pryce's "Mineralogia Cornubiensis": "Vau or Vauw, a natural cavity, hole or chasm in the earth or mine."

Another form arose from the V being transformed into F or H (F is pronounced as V in Welsh and the connection is thus more striking) and the terminal becoming more pronounced; thus the ancient underground passage in Buryan is called "Fougou;" and "Vento hugo," the well in the cave, exactly describes the position of a spring in Ding Dong mine in Madron. "Hugo-dower," that is, the cave by the water, is the common name of a fine cavern by the seaside at Mullion. Other instances might be found.

As regards 'resue,' Mr. Rickard defines it as "the act of stripping the ore in a stope, by removing the adjacent rock first and then taking down the ore-streak or seam." The origin of this term is quite obscure. Nothing resembling 'resue' can be found in any old Cornish dictionary. The nearest word the writer could get was 'sewya,' to follow, from 'sew,' follow. A Cornish quotation will illustrate:

"Sew olow on thryys lyskys."
"Follow the marks that our feet burnt."

Pryce says "Dizzue," from the Cornish dyz and hui, to discover unto, that is, to dizzue the lode. The refuse or deads of a "dyzhued lode" is called in some places the 'dyzha.'

Henry English in his 'Mining Almanack,' 1849, says:

"Dissueing—is when the lode is small and rich, to break down the strata from one of its walls, by which means it can be taken away afterward without being deteriorated and without waste."

The Welsh word 'resgyw' favors the idea that 'resue' again is a corrupt word because 'resgyw' in Welsh means to liberate, to open, make loose or set at large, etc. If the Welsh letter G be dropped the word instead of sounding in English as 'resgue' would sound exactly as 'resue.' So it is reasonable to think, from the exact meaning of the pure Welsh word 'resgyw,' that 'resue' might be derived from this source and it has the same meaning. Even at the present day in the St. Agnes district the word 'desue' is used, and in some places 'zueing.'

In considering this question it would seem that, when the similarity of the old Cornish and Welsh languages is noted, the derivation of both 'vooga' and 'resue' is fairly evident. It therefore appears that Voog or Vooga should be the correct spelling of Vug and either Resue, Dyzhu or Dizzue might be considered correct.

BRITISH IRON AND STEEL TRADE.

There has been a substantial increase in the exports of iron and steel from Great Britain in the seven months ending July 31, as detailed below:

	1902.	1903.	Changes.
Iron and steel ...	£16,001,662	£18,263,280	I. £2,261,618
Machinery	10,926,476	11,213,586	I. 287,110
New ships	3,557,262	2,858,382	D. 698,880
Total	£30,485,400	£32,335,248	D. £1,849,848

The increase this year is equivalent to about 6 per cent, chiefly in raw iron and steel and some manufactured products. Of the machinery exported this year £437,409 was mining, for use chiefly in South Africa, which has increased its purchases from £117,852 in 1902 to £198,965 for the present year.

Imports of iron and steel in the seven months were valued at £4,765,526, as against £4,564,527 in 1902, the increase being principally in structural steel.

Imports of iron ore amounted to 3,894,910 long tons, which, compared with last year, shows an increase of 228,829 tons, or 6.3 per cent. Of the total Spain furnished 3,044,055 tons, as against 3,022,248 tons in 1902.

BELGIAN COAL TRADE.—There has been much activity in Belgian coal mines during the first half of this year, the output amounting to 11,902,300 tons, which is an increase of 970,460 tons over 1902. Couchant de Mons contributed 2,315,910 tons; Centre, 1,829,580 tons; Charleroi, 4,109,500 tons; Liege and Seraing, 2,642,910 tons; Herve, 631,000 tons, and Namur and Luxembourg, 373,400 tons. It is noteworthy that stocks have increased 282,170 tons in the half year, being 998,210 tons on June 30, as against 716,040 tons last year. This shows that nearly one-third of this year's increased production has been added to stocks.

METHOD OF CONCENTRATING AT ANACONDA.

By M. SCHWERIN.

The ores treated at the reduction works at Anaconda, Montana, come from the Anaconda group of mines at Butte, 27 miles away. They consist of pyrite, chalcocite, bornite, enargite, chalcopyrite and covellite, together with much quartz, in part or completely replacing the country granite.

Two classes of ore are shipped from the mines, a first and a second class. The first-class ore goes direct to the blast furnace, and the second class to the concentrator. This second class only is herein considered.

The object of concentrating at these works is to produce a concentrate that shall contain a greater percentage of copper and iron and less silica than the crude ore. The process is not complicated by any necessity for ridding the mill product of minerals harmful to the subsequent smelting or refining operations. Some zinc-blende occurs; in certain of the ores in considerable amount, but not in sufficient proportion to affect seriously the quality of the concentrates. No attention whatever is paid to it in the mill. Two products are made, fine and coarse concentrates. Fine concentrates are roasted in MacDougall furnaces preliminary to smelting in reverberatory furnaces. Coarse concentrates go at once to blast furnaces.

The new mill, completed a little over a year ago, is built in two independent halves of four independent units each, with the power-house separating the halves. Each of the eight units is alike in arrangement and equipment, with the exception of some minor differences which will be mentioned. The methods followed in each unit are identical, however, so that the description of one unit will serve for the others.

The site of the mill is a gently sloping hillside. A high trestle serves to bring the fifty-ton steel ore-cars directly over the bins. For each unit the corresponding bin holds 1,250 tons, equivalent to forty-eight hours' supply.

For convenience, the ore may be considered as progressing by sections downward through each unit. These sections may be designated in the order of progress downward as the *crusher section,* containing also the preliminary jigs, the *middlings section,* containing rolls and jigs, the *re-grinding section,* with Huntington mills and finishing jigs, the *slime section,* with slime settling-tanks and Wilfley tables, and the *concentrates section,* with bins for settling fine concentrates and slime-overflow therefrom. All fine concentrates go to the concentrates section, while all coarse concentrates go to separate bins at the back of the mill, below the ore-bins. Both classes of bins discharge through the bottom into specially designed bottom-discharge concentrate cars.

Each ore-bin has two discharge gates, operated by compressed air, opening onto two shaking screens with 1¼-in. round holes, both of which feed the same 12 in. by 24 in. Blake crusher. The crusher discharges into two cast-iron trommels with 1¼-in. round holes. The oversize of the trommels falls into two 5 in. by 15 in. Blake crushers, which discharge into a mixing box. This box also receives the fines taken out by the shaking screens and the trommels. The ore, all of which is now finer than 1¼ in., is elevated by two rubber belt bucket-elevators to the top floor, where it enters two trains of trommels, of four sizes in each train, so placed that the five sizes made, consisting of the oversize from each one and the through size of the last one, pass by launders to their respective jigs. The coarsest trommel in each train has ⅞-in. round holes; then follow the 7-mm., the two 5-mm, and lastly the two 2½-mm. trommels.

Tailings from the two coarsest jig sets, designated as jigs No. 1 and No. 2, are re-crushed in separate rolls and pass to the mixing box with the original crushed ore, and so back again by the train of trommels onto their proper jigs. Concentrates from these jigs go to coarse concentrate bins.

In the middlings section the tailings from the third, fourth and fifth sets of jigs are de-watered in large V tanks and are drawn off into an elevator which feeds four 1½-mm. trommels, the oversize of which goes to two sets of 15 in. by 40 in. rolls.

The rolls discharge into the elevator. The through size of the trommels goes to jigs designated as No. 6 jigs. These jigs make fine concentrates, which go to concentrates section, the tailings go to waste, and the middlings to the re-grinding section.

In the re-grinding section the middlings from jigs No. 6 are elevated to Huntington mills grinding to 1 mm. In the east half the units contain four 5-ft. Huntington mills each, and in the west half three 6-ft. mills. These mills feed finishing jigs designated as No. 7 jigs. The jigs make concentrates, passing to concentrates section tailings, which go to waste, and middlings, which go back by elevators to Huntington mills for re-grinding.

The hutch discharge from jigs No. 1 and No. 2 goes to jig No. 3. All hutch-work of jigs Nos. 3, 4 and 5 is concentrates, also the hutch-work of jigs No. 6, except from the tail sieves, which is middlings, and goes with the side discharge of the same sieve to Huntington mills. Jigs No. 7 are run like No. 6.

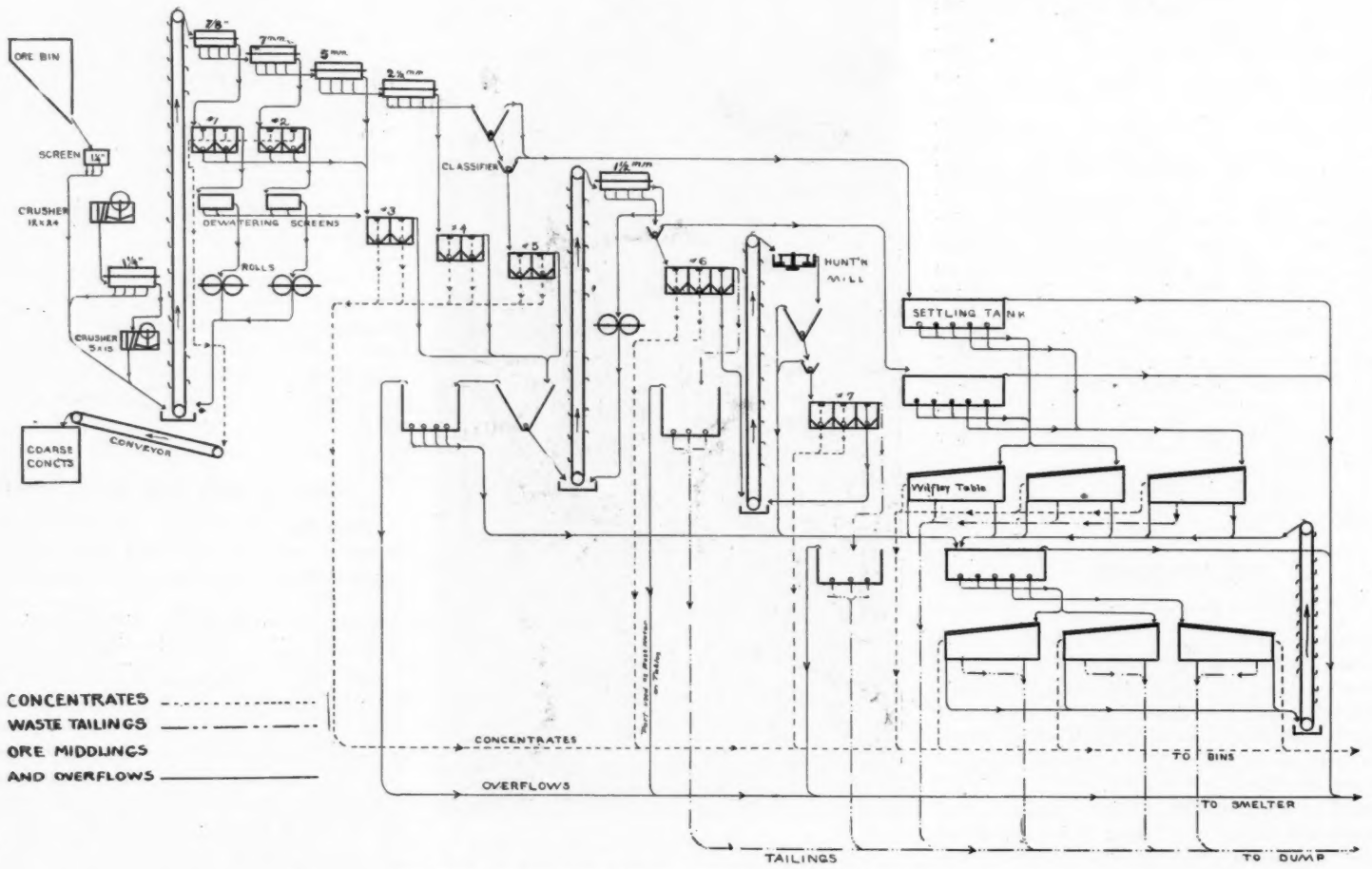


DIAGRAM OF METHOD OF CONCENTRATING AT ANACONDA.

To each unit there are two jigs No. 1 of two sieves each and four jigs No. 2 of two sieves each. Both No. 1 and No. 2 are of the Hartz eccentric plunger type, with sieves tandem. Of jigs No. 3 there are 12 of two sieves each, set tandem. Likewise the same number and arrangement of jig No. 4 and No. 5. Of jigs No. 6 there are 12 of three sieves each, set in triple tandem. Likewise of jigs No. 7. Jigs Nos. 3, 4, 5, 6 and 7 are of Evans' vertical piston motion design. The feed of jigs Nos. 5, 6 and 7 is classified in trough classifiers of Evans' design.

All slime overflows from hydraulic classifiers go

to settling-tanks in the slime section for classification for treatment on Wilfley tables. There are two floors of tables, an upper and a lower floor. All tables make concentrates, passing to concentrate section, tailings, which go to waste, and middlings, which go to elevators, thence back to the settling-tanks. The tables on the upper floor also send slime water from the head end of tables to the settling-tanks on the lower floor.

To each section there are on the upper floor 17 Wilfley tables and 14 settling tanks arranged in two rows disposed vertically, one over the other; and 16 Wilfley tables and 7 tanks on the lower floor. Some of the feed from the upper floor tanks goes to the lower floor tables. There are five plug discharges in each tank. The three nearest the head end are combined and feed the first two rows of tables. The 4th and 5th plugs feed the last row of tables. The top row of tanks on the upper floor are supplied with slime overflows from the classifiers of Jigs No. 5. The under row of tanks are supplied with overflows from classifiers of jigs No. 6. The tanks on the lower floor are supplied from classifier overflows of jigs No. 7. The overflow of all these slime settling-tanks goes, with overflow of concentrate section, to the smelter, where the water is used for other purposes. It is intended to direct the slime-tank overflows to settling ponds of great area outdoors so as to save the minute slimes which it is not yet possible to concentrate.

In the concentrates section, built separately from the mill proper, are nine settling-bins, in three rows of three to each unit, so arranged that the concentrate launder can discharge into any one, or any two adjacent bins of the two outside rows, the overflow from which is arranged to flow through any or all of the three bins of the inside row. Transverse launders convey the overflows from these inside bins of half of the mill to three larger bins in the center of the building. In the opposite half there are likewise nine bins to each unit and three larger bins to the half—making 78 bins in all.

Overflows from the six larger bins at the center go into a flume and then to the power-house for condensing water, sluicing out ashes, and for granulating slag in the smelting plant.

The capacity of one unit is about 700 tons per 24 hours at its maximum, allowing no time for shut-downs.

It will be noticed that in the scheme of concentrating here practiced no tailings go to waste until jigs No. 6 are reached, which handle stuff which has passed a 1½-mm. slot. Barren quartz getting on jigs No. 1 would go to rolls to be crushed. A portion of it would get on jigs No. 2 and then it would go to the second set of rolls for crushing again. Then a portion would go to the jigs Nos. 3, 4 and 5, from which it would be crushed in the rolls of the middlings section and go onto jigs No. 6 and then to waste. This scheme involves the re-handling of large quantities of barren rock so as to save the mineral in particles of gangue which are almost barren, from which the perfectly barren gangue cannot be separated. This is a defect from which there is apparently no escape.

Another defect, however, for which there is an excellent alternative, appears in the handling of tailings all together from jigs Nos. 3, 4 and 5. This brings it about that pieces as large as 7 mm. from jigs No. 3 are crushed down at once to pass 1½ mm.

Some anomalies are evident in the size of opening in the series of trommels used. The sizes are 1¼ in. (32 mm.), ⅞ in. (22 mm.), 7 mm., 5 mm. and 2½ mm. There is rather too big a gap between 22 mm. and 7 mm.; too small a difference between 7 mm. and 5 mm. Between 32 mm. and 22 mm., also between 5 mm. and 2½ mm., the difference need not be as small as it is.

Two sets of jigs could with advantage replace the three sets Nos. 3, 4 and 5. This could be accomplished by using a train of trommels with holes 32 mm., 16 mm., 7mm., and 3 mm. Closer sizing than this is not necessary and certainly not where, as in this case, losses are safeguarded by re-handling all tailings from these jigs.

In any scheme the ideal method is to re-crush jig tailings only to such a size that they can be handled by the next set of jigs treating finer stuff. In the scheme in use the ideal method is followed in the case of tailings from jigs Nos. 1, 2 and 5. By the assumed method, accompanying the above chain of trommels, jigs No. 4 would be suppressed and the tailings from jigs No. 3 would be re-crushed separately in one of the sets of middling rolls and elevated to the 3 mm. trommel. The actual number of jigs would not be lessened, but the number of classes is reduced by one, and the crushing of tailings of 7 mm. size to pass 1½ mm. would be avoided. The tailings from all jigs would receive separate crushing and then only to such a size as would enable them to pass to the next set of jigs.

In the middlings and re-grinding sections the method is open to no such theoretical objections. The use of Huntington mills is frequently decried, and yet many who well know the validity of the objections urged against them advocate their use on account of the very favorable results accomplished by them. The comparative merits of various fine-grinding machines is an interesting subject, but entirely apart from the present one. The Huntington mills are doing good work here, which is attested by the very low tailings made and the small loss of mineral.

In the slime section the Wilfley tables give good satisfaction. There are a few details of slime treatment used here that are deserving of attention, particularly the separate settling of slimes of different grades and their separate concentration. Other refinements could be introduced with great advantage to the operation, but these will find a place in the scheme of new mills and therefore do not yet serve as a basis for comparisons with an existing plant. A presentation of the general method pursued at Anaconda is here attempted rather than the details of practice.

MINING AT BROKEN HILL, NEW SOUTH WALES.

The annual report of the Department of Mines of New South Wales for 1902 contains interesting information as to the present status of the mining industry at Broken Hill. The low prices for silver and lead, combined with the lack of market for the zinc ore in 1902, caused the year to be a period of depression. Four mines, namely, the Block 14, the British, the Victoria, and the White Lead, closed down. However, in spite of the depression, there were more men employed along the main line of lode at the end of the year than at the beginning, the number in January having been 4,301, and in December 4,899. The Proprietary Company worked steadily throughout the year, employing more men than at any time during its existence, and made about the same output as in 1901.

The problem of successfully treating the zinc ores continued to occupy the attention of the various mines. The Australian Metal Company completed its trials of the new magnetic separator invented by Mr. Ulrich, its engineer, with results so satisfactory that the construction of a number of these machines, on an improved design, was ordered in Germany. The Proprietary Company experimented with a wet process for the extraction of zinc, and it is believed that the results have been successful, or at least are very promising. The future of the process has not yet been disclosed. It has been sufficiently successful in the laboratory to lead the company to enlarge its experimental plant in order to test it on a larger scale.

The Proprietary mine raised 644,081 long tons of ore during the year, a weekly average of 12,386 tons. This mine is an object lesson in filling, there being several stopes which show evidence of great pressure, but by keeping the filling well up and only upon one set in width at a time, no difficulty is experienced; this practice with filling in conjunction with timber is the only safe and economical method of working wide and extensive bodies of ore, such as occur at Broken Hill, say Inspectors Milne and Godfrey in their report, and ample provision should always be made, when opening a mine, for cheap and speedy disposal of waste. The Delprat shaft was completed to the 640-ft. level early in the year. Electric traction has been installed at the 640-ft. level, and even if it has not proved more economical than horses, it has at least the advantage of keeping the main drives sweet and clean. Horses are still used on the levels above the 640, but instead of stabling them underground, as formerly, they are now changed every shift, and are sent to the surface; this has proved highly beneficial to their health and condition.

The sintering of sulphide slimes, which was carried on in an experimental way in 1901, is now in constant use. (This method was described in detail in the JOURNAL of August 22.) The method has proved a great success, the roasting being done far more cheaply than formerly. Up to the end of 1902 the Proprietary Company had thus roasted about 50,000 tons of slime, 250 men being regularly employed in the work. The slimes are stacked in heaps of about 1,000 tons each. Some very big roasts have been made, the largest having been one of 13,000 tons, but it is found advisable not to fire so many heaps at one time, since the men have a better chance of attending to them than in the more unwieldy quantities where the excessive heat prevents approach, should anything go wrong. The product of the roasting has enabled a reduction in the cost of smelting to be made, and partly takes the place of the oxidized ores which can now be used in more limited quantities; the remaining reserves of oxidized ores in the stopes can thus be husbanded and made to last longer.

The Huntington-Heberlein process of desilverizing galena ores has been finally adopted by the Proprietary Company, and the complete plant is now in regular operation at the Fort Pirie smelting works. This is giving very good results. The number of smelting furnaces has been reduced since the installation of the process, without decreasing the output of bullion.

The total quantity of ore raised from the Broken Hill mines in 1902 was 1,117,054 long tons. There were removed from open-cuts 286,575 cu. yd. of material, while 274,242 cu. yd. of filling were put into depleted stopes. The quantity of timber used was 11,704,630 ft.; of explosives 319,499 lb., costing $21,-697. The number of shots fired was 400,210, the number of coils of fuse used being 52,320. There was done 10,892 lin. ft. of driving, sinking, rising and cross-cutting. The consumption of coal was 62,832 tons. The total value of the mining plants is estimated at £597,782. They have engines aggregating 9,429 h. p. and boilers aggregating 10,101 h. p. The production of ore was due chiefly to the Broken Hill Proprietary mine, the Central, the Broken Hill South and the Broken Hill Block 10, which ranked in the order mentioned. The output of the other mines of the district was insignificant.

The total number of men employed on the main line of lode at Broken Hill in 1902 was 4,983; for the remainder of the Albert district, 1,389; a total of 6,372 for the whole division. There were 12 fatal accidents during the year, 21 of a serious nature and 167 of minor character. The average number of men killed and injured per 1,000 employed was: Fatal, 2.45; serious, 4.28; minor, 34.08. Only two accidents occurred from explosives, involving four men, of whom one was killed, one seriously injured, and two slightly injured. These figures are remarkable when it is considered that over 142.5 tons of explosives were used and 400,210 shots fired. There were 55 cases of lead poisoning during the year.

The statistics of production are interesting, as showing the character of the ore now obtained. There were produced 91,523 long tons of oxidized ore and 1,023,341 tons of sulphide ore. The production of profitable products amounted to 253,409 tons, of which 223,997 tons were galena concentrates, 14,-852 tons middlings, 6,671 tons zinc concentrates and 6,141 tons of lead carbonate ore. The profitable prod-

ucts contained 6,165,226 oz. of silver, 132,548 tons of lead and 29,432 tons of zinc. The unprofitable products, which were either dumped on the surface or returned to the mines as filling, amounted to 820,369 tons, containing 6,313,084 oz. of silver, 60,051 tons of lead and 154,656 tons of zinc. The principal of these products was the tailings, amounting to 441,054 tons; the middlings, amounting to 236,328 tons, and the slimes, amounting to 105,047 tons. The tailings contained 2,526,391 oz. of silver, 21,366 tons of lead and 76,649 tons of zinc. The middlings contained 1,805,557 oz. of silver, 18,217 tons of lead and 49,664 tons of zinc. The slimes contained 1,596,515 oz. of silver, 18,399 tons of lead and 19,386 tons of zinc. From the foregoing figures it will be observed that the recovery of metallic contents of the ore in the form of profitable products amounts to slightly less than 50 per cent of the silver and about 68.6 per cent of the lead. There is, of course, a further loss of silver and lead in the smelting.

Owing to the lack of market for the character of zinc ore produced at Broken Hill, this industry did not amount to much in 1902, only 1,261 tons having been exported, as compared with 20,269 tons in 1900 and the maximum of 49,879 tons in 1899. The Sulphide Corporation has erected, at Cockle Creek, a zinc smeltery, from which it produced 220 tons of spelter up to the end of 1902, this having been the first spelter ever produced in Australia.

A REMARKABLE PIPE LINE FOR OIL TRANSPORTATION.

Edmond O'Neill, in a very interesting paper on petroleum in California, published in the *Journal* of the American Chemical Society, July, 1903, to which reference may well be made for the industrial features of the petroleum industry in California, refers briefly to the new pipe line which has been constructed by the Standard Oil Company from Bakersfield to its refineries at Point Richmond, on San Francisco Bay, a distance of 280 miles. This pipe line is 8 in. in diameter, and beside being buried in the ground in the usual manner, is covered with asbestos. The reason for this is that the oil is so viscous at ordinary temperatures that it has to be heated before it can be pumped. At each of the pumping stations, 27 miles apart, a heating plant is installed.

There has been some doubt as to the success of this pipe line, as appears in the letter from our special correspondent published in this JOURNAL, August 1, 1903. The pumping of the oil began about two months ago, and the progress through the line was so slow that failure was predicted. The line has, however, proved a success, and the oil is now coming into the Point Richmond refinery at the rate of 20,000 bbl. per day. No new pumping stations were found necessary, but if the oil comes too slowly in the cold weather four more pumping stations are to be put in. The pipe line itself holds about 100,000 bbl. of oil.

The Standard Oil Company has built 100 storage tanks at Bakersfield, each of 37,500 bbl. capacity, and two 75,000-bbl. reservoirs. According to Mr. O'Neill, the large area of the field and the great thickness of the oil sand indicate that the life of the wells will be very long. The chief use of California crude petroleum is for fuel. Many of the large steam plants have discarded coal, and now burn oil. The annual consumption of coal in California has been nearly 2,000,000 tons; nearly one-half of this has already been displaced by oil.

THE HEAVIEST ORE CARGO.—The record for cargoes of iron ore on the lakes this season has been made by the steamer *Edenborn*, which took, in the fourth week of August, a load of 9,864 net tons from Escanaba to South Chicago. On this trip, of course, a vessel has the advantage of deeper draft, being able to load to 25 ft., or 26 ft., as against 22 ft. for boats going through the Sault canal or past the Limekilns crossing in the Detroit river.

THE ARKANSAS-INDIAN TERRITORY COAL-FIELD.

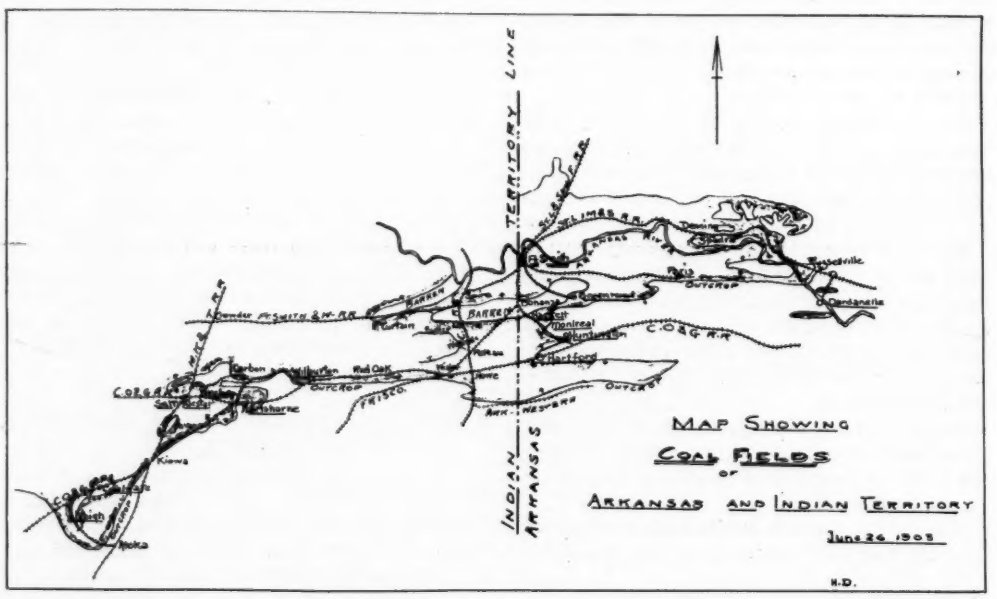
By FRANKLIN BACHE.

The Arkansas-Indian Territory coal-field is situated in the central western part of Arkansas and the central eastern part of Indian Territory. The field extends about 80 miles east of the Arkansas-Indian Territory line into Arkansas and about the same distance west of the line into the Indian Territory. The width of the field north and south may be roughly taken at about 40 miles, varying at different points.

In different portions the field is traversed from north to south by the Missouri, Kansas & Texas Railroad, the St. Louis & San Francisco Railroad and the Kansas City Southern Railway; and from east to west by the Choctaw, Oklahoma & Gulf Railroad and the Fort Smith & Western Railroad.

The city of Fort Smith, Arkansas, is geographically about the center of the field, but is 12 miles from any known workable deposit of coal.

The entire field is drained by the Arkansas river. The country is partly prairie and partly wooded country. The hills form long ridges, having an elevation of a few hundred feet, with a few mountains



rising to a height of a thousand feet above the valleys. The wood consists chiefly of scrub oak, short-leaved yellow pine, with cotton wood and large white oaks in the bottoms. The soil is generally thin, but capable of producing fair crops of corn and cotton. On the hill-tops vineyards and peach orchards are very successful. The bottom lands have rich soil, but are a trifle malarious. The prairies form excellent grazing land. The climate is very similar to that of northern Texas, and the rainfall about one-half that of the Eastern States, but usually ample for crops.

The coal lies entirely in the Carboniferous measures, which are unusually thick, aggregating about 5,000 ft. The two principal seams in the Indian Territory are separated by an interval of about 2,000 ft. The measures are remarkably devoid of fossil remains, but not entirely.

The entire field is folded, but not so sharply as the anthracite measures of Pennsylvania. In many instances the inclination of the measures is 45°, but rarely more, and in no case are the folds overturned. The axis of the folds has an average direction of about north 70° east.

There are practically but two veins to consider. One of the Arkansas veins is doubtless identical with one of the Territory veins. The other Territorv vein and the other Arkansas vein have not been correlated and do not show resemblances that would indicate them to be the same.

There is one noteworthy distinction between the Indian Territory and Arkansas coals: In general, the Indian Territory coals are highly bituminous, burning with a long flame, and making much smoke; while the Arkansas coals without exception have a very low volatile content, and are practically smokeless. Another noteworthy distinction between the Western or Indian Territory end of the field and the Eastern or Arkansas end of the field is that the coals of the Indian Territory are generally quite hard, while the Arkansas coals are quite soft, excepting the so-called Arkansas anthracite.

The veins are rarely over 4 ft. 6 in. thick. When they are it is usually because of one or more slate partings with an additional seam from a few inches to 2 or 3 ft. thick; and the only coal worked as thin as 2 ft. is the so-called Arkansas anthracite, at the extreme east end of the field. It is ordinarily considered that 3 ft. is about the minimum at which these coals can be profitably mined at present, although, doubtless, with the comparatively small area of coal available, the thinner seams will soon be worked at a profit. So far it has not been considered profitable to work coal having a pitch greater than about 30°, and this only for a thick seam of particularly good coal. Here again it is likely that steeper dipping coals will soon be worked.

In both parts of the field the coals are high grade, probably higher grade than any coal west of the Appalachian Mountains, and they do not compare unfavorably with some of the best coals of the Appalachians. The following analyses may be taken as typical of coals from the respective parts of the field:

Indian Territory Bituminous.

	Per cent.
Water	1.68
Volatile matter	41.00
Fixed carbon	51.91
Ash	5.41
Sulphur	2.72

Arkansas Semi-bituminous.

Water	.93
Volatile matter	15.55
Fixed carbon	77.54
Ash	4.84
Sulphur	1.14

Arkansas "Anthracite."

Water	.98
Volatile matter	12.20
Fixed carbon	76.81
Ash	8.17
Sulphur	1.82

The total area of the coal-bearing measures is very much greater than what might be called the practical coal-bearing area. On account of the steepness of the pitches in various parts of the field and on account of the great thickness of the strata forming the intervals between the coal beds, there is much territory—in fact, much the greater part of the coal-bearing territory—carrying coal beds at such a depth from the surface that for any immediate purpose they may be counted out of the range of practical consideration.

It is estimated that not more than 700 square miles in Arkansas and Indian Territory are underlaid by coal veins of workable thickness and of sufficiently shallow depth to be commercially practicable in the near future. Of this area, about 250 sq. miles

are in Arkansas, and the balance, 450 sq. miles, in the Indian Territory.

Taking up the mining locations in more detail, commencing at the west, the first workable field is near Coalgate and Lehigh, in the Choctaw Nation. This field is on the Coalgate branch of the Missouri, Kansas & Texas Railroad and on the Ardmore branch of the Choctaw, Oklahoma & Gulf Railroad (Rock Island System), and has been worked for about 30 years. The coal is probably the least valuable in the whole field, running high in sulphur and ash. Nevertheless, on account of the comparatively flat dip, the thickness of the seams and the shorter haul to the southwest, the mines in this location have been very large producers, supplying almost exclusively railroads in Texas—chiefly the Gould lines and the Missouri, Kansas & Texas Railroad—mining companies controlled by these interests having been practically the exclusive miners of these coals until within the last two or three years.

Proceeding northeast, the next coal that has been extensively worked is at Savanna, on the main line of the Missouri, Kansas & Texas, and about 12 miles south of South McAlester, the junction of the Missouri, Kansas & Texas and the Choctaw, Oklahoma & Gulf railroads. The bed at Savanna is the one worked at South McAlester, Lehigh and Coalgate, but the coal is considered of much higher grade, and compares favorably with the best McAlester vein coals mined near South McAlester. Mining operations at this point at present are almost abandoned. About 10 or 15 years ago the workings were extensive; but owing to the steep dips, and more particularly to a disastrous explosion, the mines were abandoned.

Farther north, near South McAlester, is the largest concentration of mining operations in the Indian Territory. Within a radius of 15 miles both the McAlester and Hartshorne beds are operated, the McAlester coal being extensively worked at McAlester, Krebs, Cherryvale, Alderson, Bache, Dow and Craig, and the Hartshorne bed at Baker and smaller operations west of the Missouri, Kansas & Texas main line at McAlester; also at Buck, Haileyville and Hartshorne.

The most extensive development of the Hartshorne bed is near the town of Hartshorne, in the Grady basin, which is about 3 miles wide and 5 miles long, the coal at the deepest point not being over 600 ft. from the surface. The mines in this basin have been the largest producers of the Hartshorne coal, and have supplied the Choctaw, Oklahoma & Gulf Railroad with coal since its beginning, and have furnished much coal to railroads in Texas, Oklahoma and Kansas.

About 13 miles east along the main line of the Choctaw, Oklahoma & Gulf, at Wilburton, the next outcrop of the Hartshorne basin is reached. Operations here have been conducted on a large scale only in the last four years, but shipments are now about 400,000 tons yearly. The Hartshorne bed here is divided into two workable veins, the upper being about 4 ft. thick and the lower vein about 5½ ft., with a 50-ft. interval between the lower bed occasionally running as thick as 7 ft. The coal is of excellent quality, and has been chiefly used for railroad purposes, but is now being extensively introduced for commercial and domestic purposes.

From here east, along the main line of the Choctaw, Oklahoma & Gulf, the outcrop of the Hartshorne beds, dipping north, is continuous, but the coal has not been opened to any great extent on account of there having been no leases granted along this outcrop until within very recent years.

The above localities cover practically all the coal mined in the Indian Territory, except that portion of the Indian Territory where the coal is of the same character as that in the western part of Arkansas.

All the other operations mentioned hereafter in the Indian Territory are mining on the Hartshorne bed; but the coal has changed from a high volatile content bituminous to a high fixed carbon coal, similar in analysis to that of Western Arkansas.

At Howe, Indian Territory, at the junction of the Kansas City Southern and the Choctaw, Oklahoma & Gulf railroads, this bed has been opened quite extensively and a large quantity of coal has been shipped, while 100 coke ovens have been steadily employed producing coke from the slack made at the mines. North of Howe, along the line of the Kansas City Southern, the same coal bed is next met at Panama, where it has been mined, but not very extensively, for a number of years. The bed here dips about 12°, and is about 4 ft. thick. West of Panama about 18 miles the same bed has been opened recently on the line of the Fort Smith & Western Railroad, at McCurtain, and coal of very excellent quality is now shipped at the rate of about 15,000 tons per month, supplying the demands of the Fort Smith & Western Railroad, and going to markets south.

Another vein, not mentioned heretofore, is mined in the Indian Territory, at Witteville and Suter. This vein is geologically the highest mined in the Territory; but the operations so far have not been very extensive.

Crossing the line from the Indian Territory into Arkansas, the largest production is in Sebastian County, where, until within the past four years, practically all the coal had been mined by the Western Coal and Mining Company, controlled by the Gould interests, which ships almost exclusively to the Gould railroads; and by the Central Coal and Coke Company, which ships chiefly for railroad use. In the past four years, however, and especially since the opening of the Choctaw, Oklahoma & Gulf from Howe to Little Rock, there has been much development of this field, and at present a considerable tonnage is sold for commercial and domestic purposes, and is finding a ready market both South and North.

The only other large mines in the State of Arkansas are at Coalhill and Denning, on the north side of the Arkansas River, on the Fort Smith & Little Rock Division of the St. Louis, Iron Mountain and Southern Railway.

Outside of the localities already described, the only mining done of any importance is in the so-called Arkansas anthracites, at Spadra, in Johnson County, and near Russellville, Pope County. The coal is really a semi-anthracite, being harder than any coal mined either in Indian Territory or Arkansas; it burns without smoke, is non-coking and ignites readily. The thickest veins, however, are less than 3 ft. thick, and the coal is mined in places below 2 ft. It sells at $1 to $2 per ton higher than any other coal mined in this district, and is sold in five different sizes, very much like anthracite. The total output is comparatively trifling, but finds a very ready market in Arkansas, Missouri and Kansas, and has been shipped as far as Omaha, St. Paul and Minneapolis and to Chicago, particularly during and after the anthracite strike of 1902.

The area covered by deposits of this semi-anthracite coal is extensive, particularly south of the Arkansas River and between that river and the Choctaw, Oklahoma & Gulf Railroad. The coal usually lies quite flat, at a comparatively shallow depth, but is rarely over 18 in. thick. The vein is generally clean, and will unquestionably be developed extensively in the near future to supply the demand for domestic purposes. It can be laid down in St. Louis at considerably less per ton than Pennsylvania anthracite, and is not much inferior to that coal for domestic purposes, or steam production, particularly where smoke is not permissible.

The location of the field is uncommonly advantageous, there being no coal west or south or southwest of it until the coals of northern New Mexico are reached, and those coals are from Cretaceous measures, and in nowise compare with it in quality. The demand for four or five years has been much greater than the supply of it, and has been strengthened by the great extension of the railroads of Texas, Oklahoma, Indian Territory and Arkansas in the past few years, in 1902 this region leading the United States in new railroad construction. The coal is taken in large quantities by railroads in Mexico and by smelters in New Mexico and Arizona.

The coke product of the field, from 280 ovens, is at present all consumed in New Mexico, Arizona and Old Mexico by copper and silver smelters.

The field's restricted area, still further restricted as it is by the necessity of working coal at a depth of under, say, 1,000 ft., makes it difficult for new operations to be established. The coal in Arkansas is at present practically all owned by large companies, and in the Indian Teritory the land is owned in common by the Indians.

The method heretofore pursued to acquire the right to mine coal in the Indian Territory has been to make a lease from the Choctaw and Chickasaw Indians, which lease is made under the regulations of the United States Interior Department, and is subject to the approval of the Secretary of the Interior. These leases have been 960 acres in extent; but the Secretary of the Interior has been extremely conservative in granting leases, so that at the present time there are only about 115 leases in the Indian Territory, and 30 of these are held by one company—the Choctaw, Oklahoma & Gulf Railroad Company (Rock Island System). During the past year no additional leases have been granted, and none will be granted in the future. The Indian Territory law, under the provisions of the Supplemental Treaty between the United States Government and the Choctaw and Chickasaw Indians, ratified by Congress in March, 1902, and by the Indian tribes in the fall of the same year, provides that not more than 500,000 acres of coal and asphalt lands in Choctaw and Chickasaw Nations shall be segregated and set aside from the balance of the land so owned; and, further, that the land so segregated shall be sold in blocks of 640 acres, at public auction, not later than three years from the date of ratification of the treaty by the Indian tribes. Pursuant to the provisions of this treaty, the Secretary of the Interior has segregated about 450,000 acres of coal land in the Indian Territory, including therein all the land heretofore leased by the Indian tribes to lessees. Pending the sale of this land, no lease will be granted.

The amount of land segregated represents considerably more than the land that is now practically coal land, since on much of it the coal lies so deep or is so thin that it cannot be operated profitably under existing conditions. When the land is sold there will be opportunity for prospective coal operators to start work, but even then it must be borne in mind that the most available land is under lease, and the purchaser of the land would purchase it subject to the rights of the present lessee. At present about the only land that can be leased or purchased in the coal-field is that owned by the Midland Valley Railroad in Arkansas, this company controlling about 30,000 acres of coal land on its line.

The method pursued in working these coal seams is practically uniform. A slope is driven from the outcrop and entries turned off on both sides, from which rooms are turned up-hill from 100 to 300 ft., according to the steepness of the dip and the quality of the roof. Usually when the breast of a slope is 2,000 ft. in, more or less, a shaft is sunk from the surface to the coal bed and a new slope driven from the shaft down the dip, with entries and rooms turned as above.

As a rule the mines are dry, comparatively little water being met. The Indian Territory mines as a rule are gassy, and also have considerable dust, making mining dangerous. In Arkansas very little gas is met by the miners, and as a rule the mines are wetter, doing away with the necessity for sprinkling the roadways. Rope haulage is used in the slope and shafts, but on the entries and in the rooms mules are used almost exclusively.

The production for the Indian Territory in 1902 was 2,735,365 tons, and that of Arkansas 2,125,730 tons; in both instances the production having about doubled in five years.

It is not likely that any great increase will take

place in the production of coal in the Indian Territory until the segregated lands are sold; but in Arkansas the production will probably increase very rapidly in the next few years, on account of the building of the Midland Valley Railroad and the development by its lessees of the coal land owned by the railroad.

Mr. Joseph A. Taff, of the United States Geological Survey, has done most valuable work in connection with the economic geology of the Indian Territory coal-field. His reports have been used by coal operators in connection with the location of their leases, and his work formed the basis by which the coal lands of the Indian Territory were segregated, he having charge of their selection. In addition to Mr. Taff, Messrs. Chance and Drake have done valuable work.

TWO NOTABLE CONCENTRATING PLANTS.

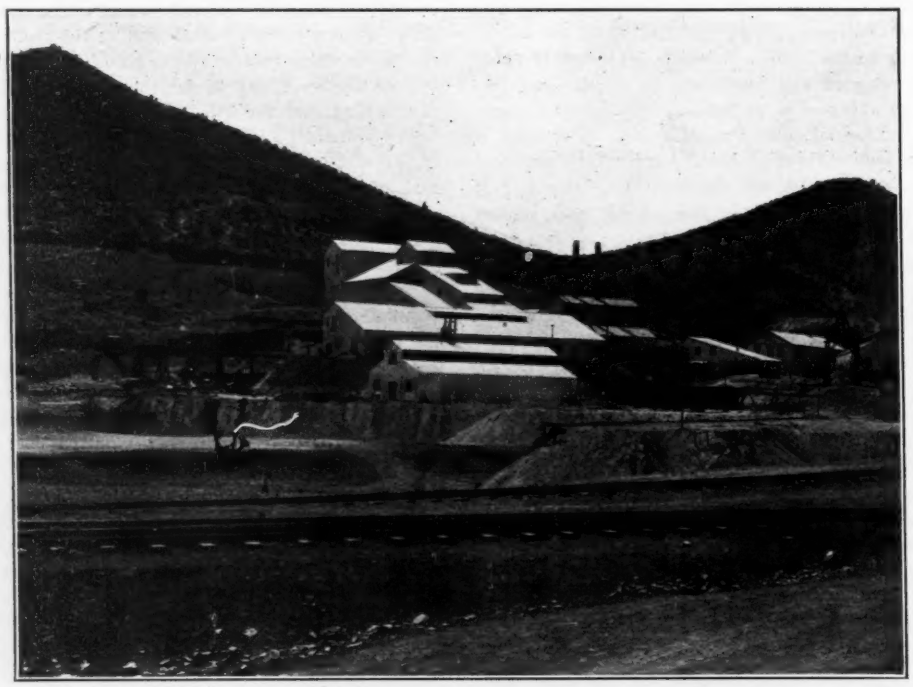
By G. A. Burr.

In the Santa Barbara camp, District of Parral, State of Chihuahua, within a quarter of a mile of each other, are situated the concentrating plants of the Montezuma Lead Company and of the Minas Tecolotes y Anexas. The first has a daily capacity of 450 tons of ore, and the latter of 400 tons.

The ores treated by these two plants are so nearly identical in class and grade, while the methods employed are so widely divergent, that it was thought that a brief description of them might be interesting.

The Montezuma Lead Company's Plant.—This plant treats about 400 tons per diem of ore averaging as follows:

Silver, 250 grams per metric ton (60 per cent of the silver being associated with lead sulphides, 30 per cent with the iron sulphide, 5 per cent with the zinc sulphide and 5 per cent with the silicious gangue).



CONCENTRATING PLANT OF THE MONTEZUMA LEAD COMPANY.

Gold, 3 to 6 grams per metric ton (associated entirely with the iron sulphide).

Lead, 6 to 10 per cent (occurring as galena).

Zinc, 7 to 12 per cent (occurring as sphalerite).

Iron, 6 to 7 per cent (occurring in pyrites).

Copper, ½ to 1 per cent (occurring as chalcopyrite).

Silica, 50 per cent. (composing the quartz gangue).

The ore, on delivery to the mill, is dumped onto grizzlies made of ½ by 2-in. bars placed 1¼ in. apart, the undersize passing onto belt-conveyors (4 in number), delivering to two pairs of 15 in. by 40 in. Cornish rolls, while the oversize is delivered to four 10 in. by 20 in. Blake crushers, beneath which the aforesaid belt-conveyors pass and onto which the product of the crushers drops and becomes mixed with the undersize from the grizzlies, passing with the same to the rolls.

From these (the coarse) rolls the product is delivered to trommels, with ½-in. screen, the oversize being carried to two pairs of 36 in. by 12 in. rolls, and thence with the undersize to the stock bins, of which there is one for each of the two units into which the plant from this point is divided. To this point the crushing is dry.

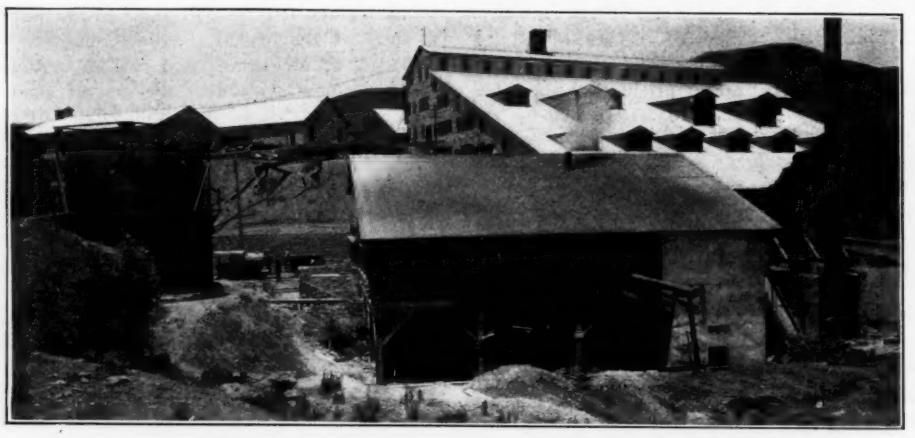
From the stock bins the ore is elevated to the trommel line, where three trommel sizes are made, as follows: 9-16 in. to ½ in., ¼ in. to 9-16 in., ⅛ in. to ¼ in. These are followed by V pocket classifiers.

Thus classified, the crushed ore is delivered to six double four-compartment Hartz jigs, where the coarser and heavier sulphides are extracted, giving the following average product (per metric ton): Ag, 1,500 grams; Au, 30 grams; Pb, 60 to 65 per cent; Zn, 4 to 8 per cent. Sixty-five per cent of the lead product of the plant is secured in the jigs.

The middlings from the jigs are re-ground in rolls and elevated to the aforesaid trommel and hydraulic classifying system, and again treated in the jigs, while the jig-tailings are unwatered and ground in seven 6-ft. Monadnock Chilean mills to 40 mesh and treated on Bartlett and Wilfley tables for the recovery of the lighter sulphides carrying gold (gold running with the pyrites), which is the true table product, while the sphalerite passes off the tables as middlings, also carrying some pyrite.

The middlings from the tables represent a zinc-iron by-product carrying about 25 to 30 per cent Zn, 15 per cent Fe, and 3 to 5 per cent Pb, which is stacked for subsequent treatment on the Wetherell electro-magnetic separators.

The table plant consists of 34 Wilfleys and six Bartlett tables and 8 Frue vanners, which treat slime materials beyond the sixth jig size and re-ground jig-tailings. No canvas tables are employed for further treatment of the slimes.



CONCENTRATING PLANT OF THE MINAS TECOLOTES Y ANEXAS.

The magnetic separating plant consists of a specially designed pipe furnace in which a suitable roast is given to the zinc-iron by-product; one Wetherell duplex-rotary type electro-magnetic separator, and two of the 6-pole belt type, having a tractive force of 400 lbs. per square inch.

These types of machines are identical with those employed at Franklin, N. J., for the treatment of willemite and franklinite ores.

I understand that the magnetic plant produces a zinc-blende product carrying 51 per cent zinc, and a pyritic product carrying 45 to 50 per cent iron, also carrying the copper and gold which were contained in the table middlings.

The lead and silver from the table middlings are recovered from the tailings of the magnetic plant on three Wilfley tables. This plant is securing an extraction from 80 to 85 per cent of the original values contained in the ore. The zinc product is shipped to Hamburg, Germany. One horse power per ton of ore treated is required for the operation of the plant, the boiler equipment consisting of three 350 h. p. Cook boilers and four 125 h. p. return tubulars.

The initial water-supply consists of 300 gal. per minute and about 1,500 gal. per minute are circulated through the mill. This is re-handled through a system of settling tanks and return pumps, the returning water passing through the surface condensers of the engine plant.

The Minas Tecolotes y Anexas.—This plant, while having a capacity of 400 tons per diem, is at present treating only 200 tons on account of shortage of water, the amount now available being approximately 150 gal. per minute. The class of ore treated is identical with that of the Montezuma Lead Company, with the following differences: The silver values are somewhat higher, 80 per cent being associated with the lead sulphide, 12 per cent with the zinc sulphide, and 8 per cent with the iron sulphide and silicious gangue. The ore carries 8 to 9 per cent lead, 0.1 gram gold, and 15 per cent zinc. The physical properties and gangue are identical with that of the Montezuma.

The motive power of this plant is furnished by five 150 h. p. Otto gas-engines, the gas being generated on the ground from wood by the Loomis-Pettibone gas plant. It has been found in practice at this plant that with the same class of wood, but one quarter the amount of fuel per h. p. generated is required as compared to the use of steam (in the old experimental plant).

The ore, on being delivered to the mill, is dumped

onto grizzlies (one inch between bars), the undersize being conveyed on belt-conveyors to the 30 in. by 14-in rolls, of which there are six, and the oversize to six Dodge crushers.

The product of the crushers is carried on a belt-conveyor to one 24 by 16-in. rolls, and the product of these rolls to the 30 in. by 14-in. rolls. From these rolls the product passes to the trommel line, from which all sizes over ⅛ in. are returned for re-grinding, the product of the trommels being delivered to the first row of tables, all grinding and crushing up to this point having been dry.

The first row of tables consists of 15 Bartletts, the middlings from which are re-ground to 60 mesh, re-classified and passed over the two lower rows of tables, having 15 Wilfleys in each row. No effort is made to recover the zinc-iron product contained in the table middlings, the only apparent object of the plant being to keep the zinc in the concentrates below 10 per cent.

The concentrates of this plant are said, on reliable authority, to average 1,000 grams silver, 30 to 32 per cent lead, 9 grams gold and 8 per cent zinc; 65 to 70 per cent extraction is secured. No slime tables are employed for further recovery from either table middlings or tailings.

VALUATION OF DREDGING GROUND AT OROVILLE, CALIFORNIA.*

By Newton Booth Knox.

The ground to be tested is first divided, according to its area, into blocks of 5 to 10 acres, and a hole is drilled in the center of each block. The Keystone driller, with a string of tools weighing about 1,200 lb., is generally employed for this purpose. The drillings, raised by means of a sand pump, are discharged into a wooden trough 12 ft. by 1 ft. by 1 ft., from which they are run into the riddle of a rocker, wherein they are rocked in the ordinary manner, great care being taken to save all the fine gold. The practice of cleaning up after each pumping (approximately after each foot of hole drilled), instead of making one final clean up, is important, data as to the occurrence of rich streaks and lean streaks, fine gravel, depth of overburden, etc., being obtained thereby. After the last clean-up all the gold from the hole is collected by means of quicksilver. The amalgam is treated with nitric acid, leaving the gold, which after a thorough washing with hot water is dried, annealed and weighed. The value of the ground is computed from the cubic contents of the hole and the amount of gold obtained. In calculating the cubic contents a factor called the "pipe constant or pipe factor" is applied. The inside diameter of the casing commonly employed is 5⅞ in., the outside diameter 6½ in. It is the practice of the district to base calculations on the outside diameter. Figuring the cubic contents per foot of pipe of 6½ in. diameter gives 0.23 cu. ft., but in practice it is found that 0.23 is much too small, giving valuations too high, such valuations being not borne out by subsequent dredging. Some engineers use 0.25 as a factor. The factor recommended by Mr. W. H. Radford is 0.27. This factor was obtained by sinking a shaft 3 ft. in diameter to a depth of 34 ft., using a drill hole as the center. The gold obtained from the shaft corresponded almost exactly with the gold obtained from the drill hole when using 0.27 as the factor. This question of factor is very important, since the difference in results between 0.25 and 0.27 may amount to 6c. or 8c. per cu. yd. The proper factor having been determined, the computation of the results obtained from any hole is very simple. The depth of the hole multiplied by the factor gives the number of cubic feet in the hole, and the quantity of gold obtained being known, the value per cubic yard is reckoned by simple proportion.

The possible profits in dredge mining are shown by the following calculations: Gravel of average depth of 11 yards will amount to 53,240 cu. yd. per acre; allowing 3,240 cu. yd. for ridges and corners left in dredging there is available 50,000 cu. yd. per acre, or 10,000,000 cu. yd. in a 200-acre tract. If the average gold contents be 21.28c. per cu. yd., the total is $2,218,000. Assuming that the land has been purchased for $150,000, and that a 5-ft. bucket-ladder dredge, costing $65,000, and a working capital of $10,000 have been provided, the total investment is $225,000. A 5-ft. bucket dredge has a rated capacity of 65,000 to 70,000 cu. yd. per month, but up to the present time the best these dredges have been able to do has been about 70 per cent of the possible running time. On that basis a 5-ft. dredge will work out the ground at the rate of an acre per month, or about 17 years for the tract. The monthly operating expense of the dredge will average about $2,500, allowing $500 for repairs, but may be as high as $3,500 a month. About 1c. per cu. yd. may be assumed as the loss in the tailings.

The daily expense of running a test-hole driller is as follows: One drill man, $3.50; one fireman, $2.50; one teamster and team, $3.50; one Chinese rocker man, $1.50; half cord of wood, $3.00; repairs, $5.00; rent of drill, $5.00; total, $24. In drilling 10 ft. per day the cost per foot would be, therefore, $2.40. Drilling contracts are let at Oroville for $2.50. The number of feet drilled per day varies greatly, according to the character of the ground and the season of the year. In soft ground 20 to 30 ft. per day can be drilled. In winter and spring when the surface is wet and soft, the cost of moving the machine from hole to hole and of bringing in wood and water increases.

Three years' drilling followed by subsequent dredging of the drilled tract has proved that such tests are only fairly indicative of the values. One company put down 23 test holes in an acre of ground, which afterward dredged about 95 per cent of the calculated value. Another company dredged about 6 acres, on which two holes per acre had been put down, and obtained only about 35 per cent. of the value calculated from the drillings.

*Abstract of a paper read before the Institution of Mining and Metallurgy, June 18, 1903.

ALLOYS FOR BEARING PURPOSES.*

By G. H. Clamer.

A good alloy for bearing purposes must consist of at least two constituents, namely, a hard one to support the load and a soft one to act as a plastic support for the harder grains. If the bearing were always in perfect adjustment with respect to the journal a hard, unyielding alloy would be the best, since the harder the alloy the lower is the coefficient of friction, generally speaking. It is found, however, that owing to the imperfect nature of the surface in practice, a hard, unyielding alloy which cannot mold itself to the irregularities of the journal will cause a concentration of pressure upon a few high spots with the result of rapid heating and abrasion. Soft metal bearings, on the other hand, are apt to give rise to unduly rapid wear of the journals; but whether this be due to the embedding of grit in the bearing surfaces, or to the fact that the metal itself has a dragging nature, is uncertain. The excessive collar wear of journals is, however, undoubtedly caused by the lead lining lapping out of the fillets.

The cheapest of the white metal alloys is lead and antimony. These metals alloy in all proportions, but the eutectic mixture is composed of approximately 87 per cent lead and 13 per cent antimony. This has been adopted by the Pennsylvania Railroad. As the percentage of antimony increases the alloys become more brittle; with more than 25 per cent antimony they are unsafe to use. Charpy considers that the alloys containing between 15 and 25 per cent antimony are the best constituted for bearings, the free antimony forming the necessary hard constituent embedded in the plastic eutectic. However, it may be pointed out that the alloys containing free lead also possess the necessary structure of a hard constituent, in this case the eutectic, embedded in the more plastic lead; although the friction of such alloys is higher than that of those containing an excess of antimony, the wear is much less. Lead is the best wear-resisting metal known; with additional antimony, increasing hardness and brittleness, the wear augments, owing to the breaking off of the harder particles.

Tin added to lead and antimony imparts rigidity and hardness without increasing the brittleness. It is desirable, therefore, when high pressures have to be carried. Babbitt metal, which is regarded as the standard of excellence, consists of 89.1 per cent of tin, 7.4 per cent of antimony and 3.7 per cent of copper. It is the most expensive of the white metals, and in the majority of cases may be replaced by a cheaper alloy.

With respect to the bronzes, composed of copper, tin and lead, it is found that the rate of wear diminishes with decrease of tin and with increase of lead. Dudley's "Ex. B." alloy, consisting of 78 per cent copper, 7 per cent tin and 15 per cent lead, was formerly believed to represent the minimum of tin and the maximum of lead possible in practice without danger of liquation of the lead occurring in the mold. Experiments have since shown, however, that while a certain proportion of tin is necessary to prevent liquation of the lead, and also to give the alloy sufficient compressive strength, a larger proportion is very detrimental. Alloys containing 5 per cent tin and 30 per cent lead have been produced without difficulty, but if the tin exceeded 6.10 per cent, castings containing 30 per cent lead could not be obtained, and if the tin exceeded 7 per cent, not more than 20 per cent of lead could be introduced under practical conditions. An alloy finally invented was composed of 64 per cent copper, 5 per cent tin, 30 per cent lead and 1 per cent nickel. This is known as "Plastic Bronze." Nearly 4,000,000 lb. of it have been successfully made during the past three years, in castings weighing from 1 lb. to over 1,000 lb. The castings are sharp and clean and can be readily machined.

*Abstract of a paper in the *Journal of the Franklin Institute*, 1903, CLVI., pp. 49-77.

THE LARGEST LAKE FREIGHT STEAMER.—A contract has been closed for a new freight steamer for the Wolvin Syndicate, of Duluth, which will be the biggest boat on the lakes. The vessel will be built at the Lorain yard of the American Shipbuilding Company, and will be able to carry 10,000 tons of freight on 22 ft. draft. She will be 560 ft. long over all, 56 ft. beam and 32 ft. deep. There will be 33 hatches and it is expected that a full cargo of iron ore can be taken on in one hour and unloaded in four hours. The hull and the bulkheads will be so arranged that the unloaders can reach every part, and no shoveling will be needed. The engines will be quadruple expansion, with cylinders 18½, 23½, 42½ and 66 in. diameter, with 42 in. stroke. The boilers will be built to carry 225 lb. pressure.

PRODUCTION OF SULPHUR BY THE CHANCE-CLAUS PROCESS.—According to the thirty-ninth annual report of the British alkali inspector, experiments made with Weldon mud as a contact material in Claus kilns show that it offers only slight advantages over iron oxide similarly used. Investigations as to the reactions taking place in these kilns, especially to determine the conditions most favorable for maximum decomposition of hydrogen sulphide and highest yield of free sulphur have shown that the working temperature should not fall below 400° F. (a higher temperature results in oxidation of sulphur to sulphurous acid, especially if excess of air be present); the air supply in the reacting mixture should not exceed 3.5 to 4 times that of the hydrogen sulphide present; the rate of flow of the reacting mixture should not much exceed 0.75 cu. ft. per minute per square foot of surface.

LOADING IRON ORE ON LAKE SUPERIOR.

One of the marked features of the system of transportation, which carries iron ore from the mines of the Lake Superior country to the furnaces of Ohio and Pennsylvania, is found in the ore-docks at the head of the lakes. Here the ore from the Mesabi and Vermilion ranges in Minnesota, which is brought down by rail from the mines, is transferred to the steamships which carry it to the ports on Lake Erie. The handling and storing of the ore and its transfer to the holds of the vessels take a very short time, and manual labor is almost entirely dispensed with.

The different iron ranges in the Lake country are served by different ports. From the Menominee and Marquette ranges in Michigan the ore goes to Marquette on Lake Superior, or to Escanaba on Lake Michigan; that from the Gogebic Range, which is partly in Michigan and partly in Wisconsin, goes to Ashland or Gladstone. At these ports there are large docks of good design; but those at the head of Lake Superior are of the latest plan and construction.

Three railroads serve the Minnesota ranges. The Duluth & Iron Range road was built primarily to reach the mines of the Vermilion Range, but it has a branch to Virginia, on the Mesabi. The Duluth, Missabe & Northern, runs north from Duluth some 60 miles, and then sends out numerous branches, reaching all the large mines on the Mesabi, from Hibbing, the present western end of operations, to Biwabik, near the eastern end. Its docks are on Duluth harbor.

The Eastern Minnesota, the latest road in the field, circles around it to the west and north, reaching the mines from Hibbing to Virginia, with some territory north of the older roads. This line, locally known as the "Hill" road, is a branch of the Great Northern, and has its ore docks at West Superior, across the harbor from Duluth.

The Duluth, Missabe & Northern and the Duluth & Iron Range roads are both controlled by the United States Steel Corporation, which manages its ore business in the region through the organization of the Oliver Iron Company. The Hill road came into the region as an outsider, Mr. J. J. Hill having secured some large tracts of land on the northern and eastern side of the Mesabi Range. Lately an agreement has been made by which the ore traffic is divided between the Eastern Minnesota and the Steel Trust roads. It is generally believed that the Hill mines and lands will finally be sold to the Steel Corporation, but this is not yet decided.

There is a general similarity in the design of all these structures, and the new docks of the Duluth, Missabe & Northern, at Duluth, may be taken as typical of them all. These docks are three in number. The floor, upon which the tracks run, is about 60 ft. above the water level. Under the floors, in two rows, are the ore-bins, which are square at the top, the lower floors sloping towards the outlet gate. Each bin is provided with an iron spout, which can be lowered until its mouth comes over a vessel's hatch. On the floor of the dock are four tracks, two used for switching, while the other two bring the cars directly over the top of the bins. The arrangement of the tracks is shown in Fig. 1.

This illustration, and Fig. 2, which gives a general view of the docks and the approach to them, are reproduced from photographs taken by Crandall & Fletcher, of Duluth. Fig. 1 shows also the method of construction adopted, which is substantially the same in all of the docks.

In the Duluth, Missabe & Northern docks, shown in the illustration, dock No. 1 is 2,335 ft. long, and has 384 pockets, holding 125 tons each; No. 2 is the same length, with 384 pockets, holding 150 tons each; No. 3 is 1,170 ft. long, with 192 pockets, holding 175 tons each. The lengths given are of the docks alone, excluding the approaches. Dock No. 3 is to be extended this year to the same length as the other two, giving it 192 additional pockets. The present storage capacity is 139,200 tons of ore, which will be increased to 172,800 tons, when the extension of No. 3 is completed. The docks will, therefore, hold ore enough to load 30 large vessels, without receiving any additional load; while from 16 to 20 boats can be loaded at one time.

The quantity of ore handled over these docks, in a good day, in the height of the season, is 50,000 tons, which requires the movement of about 1,400 cars, and the loading of eight to ten boats. The highest receipts for one day, in this season, were 79,800 tons, which represented the switching and unloading of over 2,200 cars. The time of loading a vessel is extremely short. The lake ore-boats are provided with numerous deck-hatches. When the boat is alongside the dock, the spouts of the bins are lowered to the hatches, the gates opened and the ore pours into the hold. There are no tides on Lake Superior, so that there is no difficulty about adjusting levels of vessels. Very little manual labor is required; so little, that, in the busiest time, the docks look almost deserted.

The record cargo for the present season, so far, is that of the steamer *Kerr*, which took on 7,725 tons of ore. The loading of this cargo was done in 2 hours 15 minutes, showing an average of over 57 tons per minute.

The total quantity of ore handled at these docks, from the opening of navigation up to August 1, about three months, was 2,745,845 tons. It must be remembered that shipments for the first month of the season were rather slow, reducing the average. In the first half of August 553,000 tons were received, an average of 36,867 tons a day; or of 42,538 tons per working day, as Sunday is an off-day, except in cases of special rush. The number of boats loaded for the season up to August 15 was 615 in all. These figures will give some idea of the work which has to be done.

The cars used are all hopper-bottom, eight-wheeled cars. Most of them are of wood, and are rated at 35 tons capacity. Recently a number of steel cars, carrying 50 tons each, have been put in use. The cars arrive from the mines in trains of 30 to 40 cars each, and are switched and sorted out in the yard, some distance from the docks. Mesabi ore carries considerable moisture, but very little trouble is experienced from packing down in the cars. During the closing weeks of the shipping season, however—say, after the first week in November—the ore is apt to be frozen in the cars. It then requires hard work to break it out and dump it. Machines have been devised to do this work; but none has been brought forward, so far, which is sufficiently practical to warrant the expense of installing it.

The ore is graded at the mine and the cars are carefully marked and ticketed. Care must be exercised in the sorting yards and in switching on the docks, that there is no mixture of different grades in the bins, and that adjoining series of bins are filled with the same ore, so that vessel can be loaded with the ore required. A mixture in a cargo of Fayal No. 1, for instance, with Lincoln, or Biwabik, might make trouble at the receiving ports.

It is, of course, an object to unload the cars as fast as possible, and to return the empties promptly. During the season there is always a pressure from the mines for cars, and it is necessary to keep them in the yards, or on sidings, as short a time as possible. As the roads run direct from the mines to the shipping port, this is a simpler problem that it would be if the cars had to pass over several lines, where delays at junction points might be expected. As a rule, there is no trans-shipment from mine cars. The railroad cars are run directly on the mine switches, where they are loaded from the chutes in the case of shaft mines, or directly by steam-shovels, in the large open-pit mines; or by steam-shovels also, where the load is taken from the stock-piles accumulated before the opening of the season. This is with the soft Mesabi ores; with hard ores, the loading is usually from the crusher chute directly. Here again, the speed of the work is remarkable. At the Mahoning, for instance, an open-pit mine, the writer saw the 35-ton cars loaded by the steam shovel in from three to five minutes each.

To return to the docks, it will be seen, from the illustrations, that the construction is entirely of wood. Each of the docks is a great mass of pile and timber trestle work. This involves danger from

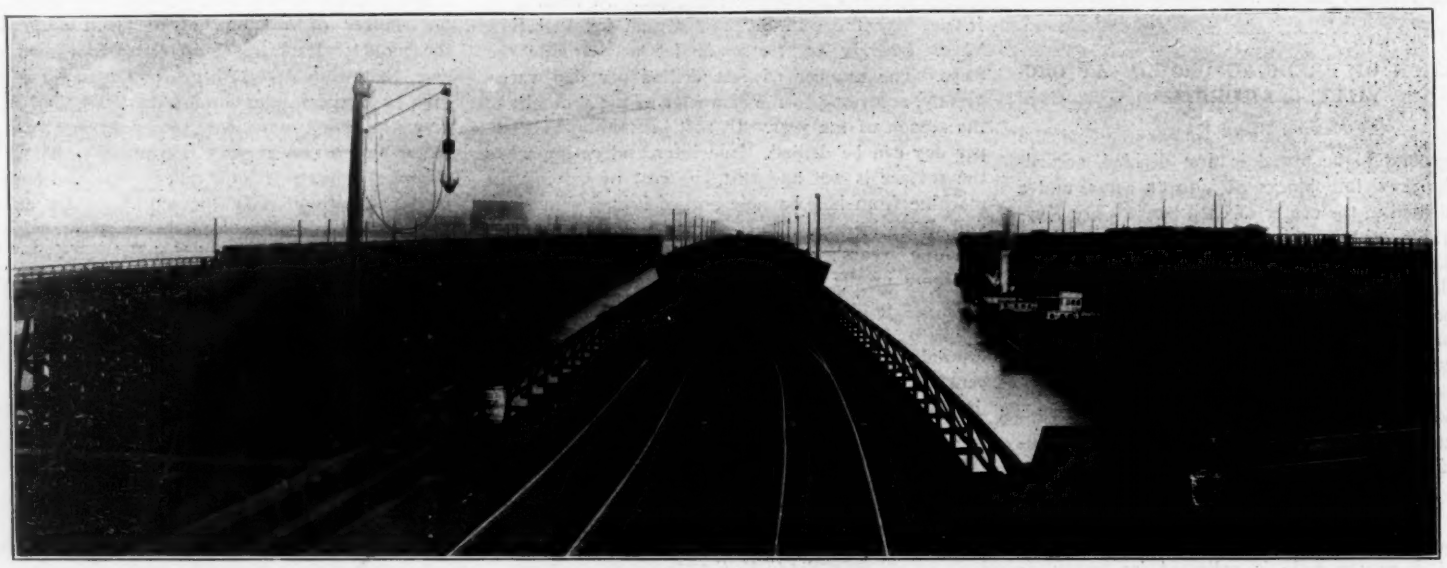


FIG. 1.—DULUTH, MISSABE & NORTHERN ORE-DOCKS AT DULUTH.

fire, against which constant vigilance must be exercised. Should a fire once get any headway at all, the loss would be very great. It is rather surprising that some use of steel construction has not been made.

The Great Northern dock at West Superior is very similar to those above described, though it is about 15 ft. higher above the water level. The trestle approach is very much longer, as the tracks have to rise from a low plain, instead of running in from the hillside, as at the Duluth docks.

Upon the whole, the system of shipping has been well designed to secure the greatest possible dispatch, with the least possible manual labor. These ore-docks show careful planning and working out of details, with corresponding excellence in results.

FIG. 2.—DULUTH, MISSABE & NORTHERN ORE DOCKS AT DULUTH.

SUDBURY NICKEL MINES—A NEW ERA.

By Our Special Correspondent.

It is the unexpected that often happens in mining, as in many other things. The present season has so far been the quietest ever seen in the Sudbury district since the first nickel mine was opened up over fifteen years ago. This temporary lull is not owing to any trouble at the mines or to any abatement in the demand for nickel, but to three special causes. In the first place, the International Nickel Company had sufficient ore taken out ahead to keep the concentrating plant going as usual, while the new smelting works, not of four reverberatory furnaces as at first reported, but of two immense stack furnaces to treat 1,800 tons of ore every 24 hours are being erected. It will probably take till next spring to finish the works, as the foundation has not been completed yet. Then, with the exception of a little exploiting work at the Gertrude mine, the nickel mines and smelting plant of the Lake Superior Power Company have been closed down the greater part of the season, pending the reorganization of the company's affairs. But under the new and energetic management of Cornelius Shields and his able assistants there is every prospect of the pulp mills, steel works and nickel business of this company being put on a sound paying basis before long. Dr. A. P. Coleman, of the Practical School of Science, Toronto, who lately visited the Mitchipicoten district, says that the Helen iron mine looks better this year than on any previous examination of it. The third cause of the present inactivity in the nickel industry of the Sudbury district is the suspension of work at the principal mine of the Mond Nickel Company, due, it is said to alterations being made in the Mond nickel refinery in Wales. But the company's smelting plant is kept running the whole time on old ore, to which about 100 tons a day is added from the North Star mine in Snider; and, strange as it may seem, the development work on this property and the Gertrude mine is all the actual mining that is being done on the whole nickel belt just now.

But on the other hand, the outlook for the future has undergone a remarkable change within the past two weeks, and we are evidently at the beginning of a new and more progressive era in the working of these nickel mines. Negotiations that have been carried on, almost secretly, for some time have resulted in the purchase of nearly all the remaining nickel properties in the district by two if not three new companies, with abundance of capital to conduct operations on the largest practicable scale. The most of the North Range, including several very extensive deposits of ore, has been secured for an English company, and the Mackenzie mine in Levack, with a number of auxiliary claims near it, has been bought by some American capitalists, who have already commenced to build cabins, and to make other preparations for going to work. An adjacent group of properties has been bonded by a third party, but supposedly for one of the other two companies. So the threatened danger of a monopoly of the Sudbury nickel mines has vanished at last, and we are likely to see unprecedented activity and interest in developing the mines and in building new plants, in a very short time. But there are still left unsold enough good mines and ore-bodies to equip another big company, besides any number of common prospects, that will no doubt receive more attention now than in the past. Some of them are well worth opening up.

After seventeen years of good and faithful service, first as head smelting man, and later as manager of the entire works of the old Canadian Copper Company at Copper Cliff, James McArthur has given up his position with the company, for a while at least. He may be said to have worked virtually day and night during that long and laborious period, and he was seldom or never seen away from the works except when subpœnaed to attend an inquest over some accident or other at the mines or roast-yards. A plain, reticent, even-going Scotchman of the very best kind, he personally directed all the varied operations of the company with the greatest efficiency and the least amount of fuss, and the men employed under him, at one time over 1,500 in number, had absolute confidence in his fairness and good common sense. It may also be said that to him is due more perhaps than to any other man the credit for proving that the nickel mines of the Sudbury district could be made to pay well when worked in the right way.

A NEW CHANGING HOUSE AT THE CLIFFS SHAFT MINE.*

By John S. Mennie.

On the night of December 1, 1901, the changing house at the Cliffs Shaft mine was totally destroyed by fire, causing quite a financial loss not only to the Cleveland-Cliffs Iron Company on the building, but also to its employees on their clothing. The losses on buildings of this description, when built of wood, would indicate that they are extra hazardous, and in fact the insurance rates are almost prohibitory. In considering the erection of a new building it was thought that it would be cheaper in the end to build it of brick, which while not absolutely fireproof, would be practically so. The other essential requirements were, an easy method of keeping the building clean and the best possible arrangements for the comfort and cleanliness of the occupants.

The building as erected is 30 ft. 4 in. in outside dimensions and 11 ft. from the top of the floor to the underside trusses. The foundation walls up to the floor line are built of common rubble stone, laid up in cement. The exterior walls above the floor line are in common brick laid up in lime mortar, and are 10 in. in thickness, consisting of two 4-in. courses of brick with a 2-in. air space to prevent sweating of walls. The two courses of brick are tied together every fifth course with clipped headers. Where the trusses rest on the walls piers are formed by building an extra course of brick on the outside. Three division walls run across the building, they are solid, 8 in. thick, and are carried up to the roof boards as fire walls.

The roof is carried on light trusses of 6 by 6-in. timber, spaced about 8 ft. centers. On these are laid 2-in. matched and dressed common pine, face down; strips 1 by 2 in. in size are then nailed on across this planking, spaced 2 ft. centers and then covered with 1-in. common hemlock shiplap, making a 1-in. air space in the roof. The roof covering is two-ply rubberoid roofing. The exterior woodwork is painted two coats of reddish-brown paint, the interior woodwork 2 coats light drab paint, and the interior brick walls were given one coat of white cold water paint.

The floors throughout are of concrete and all are graded to the center of the rooms where connection is made through gratings to a 6-in. tile sewer pipe. These pipes are then carried under the floor to the outside of the foundation walls and empty into a box drain. The floor under the shower baths is graded to the wall to a drain of sewer pipe split in halves and these are connected to the main drain.

The entrance to the building is by two doors, one at each end of what is termed the change room. This room is 28 by 54 ft. in size. Against the walls of this room are set up 126 lockers 12 by 12 in. by 5 ft. high, for street clothes. They are made of expanded metal, and being each used by a night and a day man, they accommodate 252 men.

In the center of the room are two drying racks for mine clothes. These are made from 1-in. iron

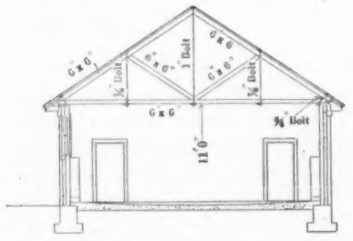
* Abstract from *Proceedings* of Lake Superior Mining Institute, August, 1903.

pipe and fittings and have four bars each. Over each of these racks is a large ventilating hood made of galvanized iron on 1¼-in. angle-iron frames; these rise into three 16-in. pipes which are carried through the roof and capped with 16-in. "Star" ventilators. Stationary benches of 2-in. plank on iron standards extend the full length on each side of the room between the lockers and the drying racks.

From the north end of this room entrance is had through two doors to the wash room, which is 28 by 46 ft. in size. Running lengthwise of this room are three wash troughs. These are made of ⅛-in. iron bent to a semicircle and are set up on iron standards built into the concrete floor. Hot and cold water is brought into the building through separate pipes in a tile-pipe conduit under the floor and is distributed in two separate pipes to each trough and extended the full length with upright connections to large closets. One of these rooms is used by the shift-bosses as a change room and office, the other as an emergency hospital, and is fitted up with operating table, stretcher and surgical appliances. The closet has shelves and is supplied with such medical supplies as might be needed in case of accident. This room has a wide door as an outside entrance.

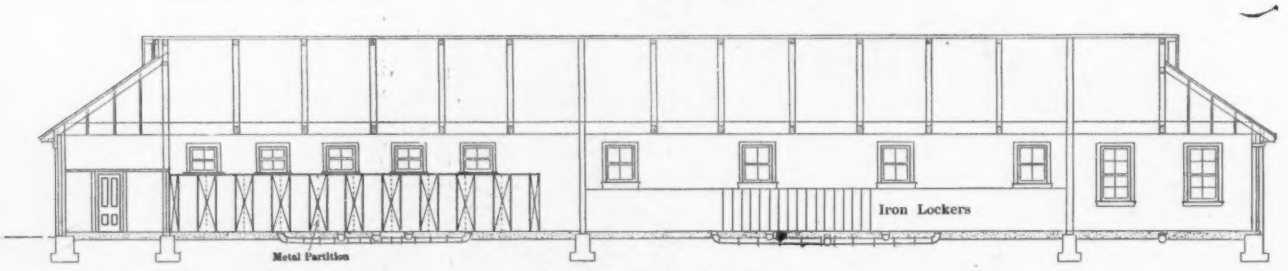
Returning to the change room there are two doors opening from its south end into a room 20 by 28 ft. in size, used as a dining room. This room was put on as an experiment. It is fitted with two long tables and benches. Being a separate room and separately heated it is much more comfortable to sit in than the change room. Its use also tends to keep the change room cleaner. As the room is now used to its capacity it would seem to be advisable to extend this feature in any similar building hereafter erected, so as to accommodate all the men who may clothes, that no part of the building would be damaged to any material extent.

COST OF DRILLING OIL WELLS.—Oil and gas wells are drilled by contract in Kansas at 80c.@ $1 per foot, not including expense of fuel and water. Where natural gas can be purchased from producing companies the customary charge is 5c. per foot of hole drilled. If coal has to be burned, the consumption in sinking a hole 1,200 to 1,500 ft. deep will be 25 to 30 tons. The cost of water is extremely variable, depending on the location of the hole. If the latter be near a stream or pond whence the water can be pumped the cost is insignificant; sometimes water can be obtained at comparatively small cost by spudding a hole near the well to be drilled; otherwise the water will have to be hauled in wagons at varying expense. The cost of a well-drilling rig, com-

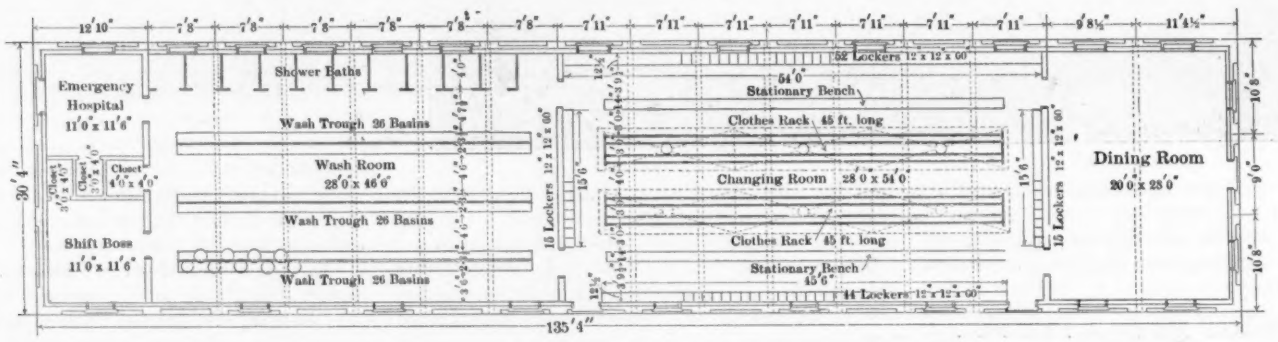


CROSS SECTION.

EAST ELEVATION.



LONGITUDINAL SECTION.



FLOOR PLAN.

CHANGING HOUSE AT CLIFFS SHAFT, CLEVELAND—CLIFFS IRON COMPANY.

faucets about 5 ft. apart. On these pipes and the edge of the trough rest individual enameled iron wash basins. Each man draws clean water into his basin tempered for heat to suit himself, and after washing empties it into the trough, when it immediately runs off to the drain. This system of wash troughs and basins was in use at the Champion Iron Company's mine at Beacon, and seemed to be so clean and admirable in every way that it was adopted in this building.

Against one of the walls are arranged ten shower-bath stalls about 4 ft. square in size and 7 ft. high. The frames of these are of 1-in. angle iron and are covered with corrugated iron to within about 18 in. from the floor. The door opening is provided with a drop curtain of linoleum. Each stall is fitted with a spray shower-bath fixture with mixing chamber, and supplied with hot and cold water.

In the north wall of this room are three doors, the center one opening into a janitor's closet for keeping brooms, hose, etc., the other two into rooms each 11 ft. by 11 ft. 6 in. in size. Both rooms have use the building. The building is heated by the Webster vacuum system, using exhaust steam. The steam is brought into the building under the floor through iron pipes in a tile-pipe conduit and distributed to the different coils of pipe. These coils are placed under the lockers, benches, clothes racks and wash troughs. The other rooms are heated by wall coils.

The entire cost of the building was $6,604.

Commenting on the building after being in use, I would say that the lockers for street clothes are rather small and that the 12 by 16 in. locker of same make should be used. They would be large enough in cases where the one shift is up and changed before the other shift begins to change. The amount of wash-trough room is more than is required, and might be cut down one-third for the number of men arranged for in the building. The danger of fire is reduced to a minimum, and in fact is practically confined to the clothes in the change room. The doors in this room leading to other rooms have been tin-clad, and we think, if a fire should occur in the plete with all the tools, is about $3,000. The drilling crew comprises two men per shift, who are paid $5 and $4 respectively, making the labor cost per 24 hours come to $18. They will drill an average of perhaps 100 ft. per day, wherefore the actual labor cost of drilling is about 18c. per foot, but this is greatly increased by the time consumed in setting up and taking down the rig and moving from one location to another. The depth of the holes to the oil and gas sands in Kansas is from 1,000 to 1,500 ft. Probably one hole per month per rig would be a fair average, allowing for all lost time, save in the inclement season of the year and times when the roads are too deep with mud to permit hauling heavy loads. There is a good margin in drilling under contract at $1 per foot, but the profits on many holes may be lost in some piece of misfortune which involves a fishing job. If a well strikes oil or gas, the contrractor puts in the casing and tubing that may be required and charges the owner of the well with the cost of the material, this being over and above the drilling price.

ABSTRACTS OF OFFICIAL REPORTS.

Standard Consolidated Mining Company, California.

The report of this company for 1902 shows total receipts as follows: Balance from previous year, $117,664; bullion produced, $360,775; miscellaneous, $16,418; total, $494,857. The payments charged were: Operating expenses, $295,050; prospecting, $13,577; new properties, $18,038; sundries, $659; dividends 105,108, $71,358; total, $398,682; leaving a balance of $96,175 forward to current year.

The total ore produced was 22,577 tons, 18,048 tons from stopes, and 4,529 tons from development work. The mine cost sheet shows as follows:

	Per ton.
Labor	$5.391
Supplies	0.946
Transportation	0.109
Mine expenses	0.125
Power, assay office, etc	0.466
General expenses	0.895
Total	$7.932

In the mill 22,577 tons were treated and 67 concentrates saved. The assay value was $16.97 in gold, and $1.51 in silver; the extraction was $11.89 in gold and $0.26 in silver; being 70.1 per cent of the gold, 17.0 per cent of the silver, or 65.8 per cent of total values. This represents the bullion actually obtained from plates and battery; further savings being made from concentrates and tailings.

Tailings plant No. 1 treated 17,204 dry tons, saving an average of $3.183 per ton in gold, and $0.432 in silver; a total of $3.615, being 76.7 per cent of the assay value. Plant No. 2 treated 3,900 dry tons, saving $3.834 gold and $0.372 silver; a total of $4.206, or 82.6 per cent. The total extraction, from mill, concentrates and tailings, was, per ton, $15.62 gold and $0.86 silver; a total of $16.48, or 89.1 per cent.

The mill cost sheet shows expenses per ton as follows:

Labor	$0.609
Supplies	0.281
Water	0.046
Power, assay office, etc	0.449
General expenses	0.457
Bullion charges	0.140
Total	$1.982

The costs per ton in the tailings plants were as follows:

	No. 1.	No. 2.
Labor	$0.291	$0.490
Slum-pond	0.143	0.006
Supplies	0.685	0.708
Water	0.018	0.017
Preparing and hauling	0.833	....
Power, etc	0.156	0.210
General expenses	0.189	0.336
Bullion charges	0.063	0.073
Repairs	0.059	0.266
Royalty	0.020	0.050
Totals	$2.457	$2.156

The report of Manager R. Gilman Brown says:

"The results of last year's work compare favorably with those of the year before. The summary shows an excess of income over operating expenses of $81,694 as against $80,409 for 1901-2. This left a surplus of $10,000 after providing for four dividends. This sum, however, was more than consumed in necessary changes to our tailings plant and in the final payment on the new Bodie property acquired last year, so that we end the year with $21,000 less in our reserve. It is hoped that we shall more than make this up during the coming year, but in any case the money taken from our surplus has been well spent: we have important ore reserves in our new ground and look for further valuable developments; and the consolidation of the tailings plants has already resulted in a lowered cost of 35c. per ton, or $6,000 gained on the 17,000 tons treated.

"In development work, 7,500 ft. has been carried out, by far the greater part, as is usual, being above the 318-ft. level. The ore reserves resulting from this work amount to 12,000 tons, a gain of a thousand tons over the previous year. Our cost for development work always has been, and always must be, large; it would not be surprising if to many it appeared excessive, so that a word on this score will not be out of place. We prosecuted development work on 43 different veins last year: this fact, in itself indicating the large number of headings to be advanced and the large amount of cross-cutting to reach the different veins, should explain this matter amply. It would be very different if we had only one or two veins of considerable size on which to carry out developments, but under the conditions we are to be congratulated upon the showing that has been attained. We have produced from development work practically the same as last year, 4,500 tons, while our total tonnage is 2,000 tons more than for the year previous, and 4,000 tons more than in 1900-1.

"The summary of our ore reserves indicates the sources of supply for the coming year.

"The total output of ore has been 22,577 tons, an increase of nearly 2,000 tons over last year. The value per ton has been 66c. less, but the returns from the mill 30c. more. The percentage of this coming from above the 318-ft. level has rather increased than diminished, and it should be borne in mind that the greater amount of our ore reserves is still above this horizon. The larger tonnage has assisted in cutting down the cost per ton for mining work by 47c. from last year's figures; $7.04 per ton for the cost of mining is a figure that we have never before reached: the proportion of general accounts nominally belonging to this department brings the cost up to $7.93 per ton, or 47c. cheaper, as mentioned above.

"Little has been done in the line of mine improvement, except in the way of general repairs. But we have completed our independent water system designed to protect the shaft-house. The town system does not cover this and our only other reliance is upon hand extinguishers. The expense of this, $2,000, is fully justified by the results.

"As heretofore, the whole tonnage produced by the mine has gone through the mill at a cost per ton of $1.98, an additional saving over last year, and notwithstanding the fact that it was not expected. This gain may be taken as wholly due to increased tonnage, for the total cost in the two years coincides within less than a hundred dollars. It would appear, however, that we have increased the efficiency of the mill to the last notch and it would not be surprising if these figures were not matched in another year.

"The experiments regarding slimes treatment having proved inconclusive, and the congestion in our tailings beds becoming acute, a further radical move in the way of enlargement of our No. 1 plant became imperative.

"To make the whole situation clear, a resumé of the conditions obtaining follows: Our mill, with a capacity of 1,700 tons per month, discharged its tailings into our No. 2 or direct-treatment plant. From this plant about 47 per cent was discharged as slimes and unfit for direct treatment. The 53 per cent of coarse sands that were retained, after treatment were discharged to the ponds, where subsequently they were mixed with the slimes, partly dried by contact with the atmosphere, to make a product suitable for treatment in our No. 1 tailings plant. This double treatment of the sands had proved itself fully worth while when dealing with high-grade tailings; that is, the extra cost of $2 per ton was more than offset by the increased saving. When, however, the grade of our mill ore was lowered, resulting in a lowered tenor for the tailings, the value of this treatment was lessened. Accordingly, when we came to study the problem in all its details we found that it would be to our advantage in the long run to abolish direct treatment, using the six sand vats of this plant for further enlargement of No. 1 plant. The cost of this change appears in detail in its proper special account. This was one of those expenditures that had to be incurred unless we were prepared to waste a part of our tailings uselessly down the cañon. The gain, however, as already related, was considerable, and although the actual profit accruing from tailings treatment during the year was some $5,000 or $6,000 less than the year previous, this was due to the lower grade of tailings, and there would have been a still greater falling off from the same cause with the old arrangement of plants. Moreover, while the enlarged plant was put into commission during August, it cannot be said to have been in full swing for more than one or two months of the season. As to further additions to the tailings plant, it is too soon to speak. We have reached the limit, it would seem, in the size of plant if we continue to use our present system of mixing slimes with sand for preparatory treatment. The preparatory work occupies at present all the ground available. It is among the probabilities, however, that we shall devise some modifications of our present method, resulting in a larger tonnage. But our plans are as yet too unsettled for us to even indicate the lines of our probable advance, if any. Experiments of this kind are at best very slow, and we shall indeed be fortunate if the tests now in hand can be carried out with sufficient success for us to have the results embodied in a plant for the season of 1904.

"We have continued our work in the direction of new properties along the same conservative lines as in the past and have investigated in the course of our work a large number of prospects more or less developed. One of these, the Pennsylvania Mine in Brown's Valley, Yuba County, California, possessed the ear marks of a good property, under proper management. There were some drawbacks, such as bad condition of the shaft and a considerable amount of water, but these were more than offset by the important and extensive ore-shoots that had been productive in the upper levels. The mine, however, was practically gutted, so far as development went; but we have taken hold of it with the intention of going to a definite extent in expenditure in opening up the lower continuation of the ore-shoots, a limit not to be passed except under very favorable conditions. The terms granted to us on the property are exceptionally good, and the present equipment, in the way of stamp mill, hoisting plant, etc., is excellent. At this date the developments are indeterminate, but in the course of another two months definite results should be looked for.

"It seemed wisest for us to make no expenditure on the Plumas Development Company's property during the year other than for performing the necessary assessment work on our various unpatented claims, as it seemed that by waiting we should gain material light from the results of work now being prosecuted upon adjoining property. It is confidently expected that these results will be reached during the present season, but in any case it should be borne in mind that the property has undeniable value and that our majority holdings in it have cost us only about $14,000.

"It gives me pleasure to commend most cordially the faithful and efficient work of Mr. R. C. Turner, our superintendent in Bodie, as well as of the whole Bodie force. The company is fortunate in being so well served."

BOOKS RECEIVED.

In sending book for notices, publishers, for their own sake and for that of book buyers, should give the retail price. These notices do not supersede review in a subsequent issue of the ENGINEERING AND MINING JOURNAL.

Transaction of the American Society of Heating and Ventilating Engineers. Volume VIII. William M. Mackay, Secretary. New York: published by the Society. Pages, 232; illustrated.

First Report to the Royal Commission on Coal Supplies. Volume II., Minutes of Evidence. Volume III., Plates and Diagrams. London, England: H. M. Stationery Office. Volume II., 364 pages; Volume III, 60 plates.

The Moral and Material Progress of India, 1901-1902. Prepared by Francis C. Drake, under instructions of the Secretary of State for India. London, England: H. M. Stationery Office. Pages, 365; with maps and diagrams.

Nineteenth Annual Report of the Commissioners of the State Reservation at Niagara. Andrew H. Green, President. Albany, N. Y.: State Printer. Pages, 276; illustrated.

Mining Bureau of the Philippine Islands. Bulletin No. 3. Report on a Geological Reconnoissance of the Iron Region of Angat, Bulacan. By H. D. McCaskey. Manila, P. I.: Bureau of Public Printing. Pages, 64; with maps and illustrations.

The Elasticity and Resistance of the Materials of Engineering. Sixth Edition, Rewritten and Enlarged. By Professor William H. Burr. New York: John Wiley & Sons. London: Chapman & Hall, Limited. Pages, 1016; illustrated. Price, $7.50.

BOOKS REVIEWED.

Biennial Report of the State Bureau of Geology and Mines of Missouri. Ernest Robertson Buckley, State Geologist. Jefferson City, Mo.; State Printers. Pages, 84; illustrated.

This report contains no special papers, being a summary of the work done by the Missouri Geological Survey for the years 1901-1902. To this are added some notes on field-work done, and statistical information on the chief mineral products of the State. There is a short discussion of the development of Mineral resources, the larger portion having reference to probable existence of petroleum and natural gas.

Die Entwicklung des Nieder-rheinische-Westfälischen Steinkohlen-Bergbaues in der zweiten Hälfte des 19 Jahrhunderts. Issued by the Verein für die Bergbaulichen Interessen im Oberbergamtsbezirk Dortmund in Gemeinschaft mit der Westfälischen Berggewerkschaft-Kasse und dem Rheinish-Westfälischen Kohlensyndikat. Vol. III. Stollen, Schächte. Pages, 580, illustrated. Published by Julius Springer, Berlin, 1903. Price of the entire work, 160 marks.

The present volume, treating of shafts and tunnels, is one of this great series, to which we have previously referred in our columns, Volumes II., IV. and V. having already been published. The present volume is uniform with the others and is presented in the same superb manner. We conceive this series to be one of the highest examples of the making of modern German technical books. Vol. III. is the work of two authors, Berg-Assessor Schulz-Briesen and Berg-Assessor L. Hoffmann. The former treats of tunnels; his work is naturally brief, comprising only nine pages. The remainder of the book, treating of shafts, is the work of Herr Hoffmann. He covers the subjects of shaft sinking and shaft maintenance in a very comprehensive manner and thoroughly pictures the developments of modern German colliery practice.

Geological Survey of Alabama. Bulletin No. 7. Preliminary Report on the Water Powers of Alabama. By B. M. Hall. Montgomery, Ala.: State Printers. Pages, 192; illustrated.

The Geological Survey of Alabama has, for some years, been engaged in the investigation of the water resources of the State; much of this work having been done in co-operation with the United States Geological Survey. The State geologist, Dr. Eugene A. Smith, has had charge of the investigation of the waters retained in the soil—the artesian waters and underground circulation—and his report on this branch of the subject is now nearly ready for publication. Most of the material for this report has been collected by the Alabama Geological Survey. The run-off, on the other hand, is utilized for transportation, for domestic and municipal water supply, and for power, and this branch of the subject has been in charge of Mr. Hall, who has for some years been employed by the United States Geological Survey in collecting records of the gage heights, and in making surveys and discharge measurements of the principal streams of Alabama, and adjacent States, from which the values of these streams for the various purposes above enumerated may be closely estimated. In the collection of these data, the Alabama Geological Survey has contributed to the extent of paying the observers of the gage heights at seven stations along Alabama streams.

While the present report deals with only one of the many uses to which the run-off of the streams may be put, for the production of power, this is in many respects, especially in Alabama, the most important of these uses, for the great increase in the applications of electricity has of late turned attention to the utilization for its production, of water powers which have heretofore been allowed to run to waste, and there can be little doubt but that in comparatively short time, all the available water power of the State will be turned to account.

Wisconsin Geological and Natural History Survey. Bulletin No. 10. Highway Construction in Wisconsin. By Ernest Robertson Buckley. Madison, Wis.: Published by the State. Pages, 344; illustrated.

The purpose and scope of this excellent report are so well expressed in the introduction that the reviewer cannot do better than to use its words. The writer says that, up to the present time, highways in Wisconsin have meant simply narrow tracks of land connecting different parts of the country. The highest conception of the public thoroughfare in many parts of the State has been its maintenance in a passable condition. Any economy which might be involved in the construction of permanent pavements has been given very little attention by the people, and much less by the State Legislature. Up to within a few years ago, little or no attempt had been made to educate the people in the principles of road construction and maintenance. In the country districts the improvement of the highways has been mainly in charge of persons who have had little or no knowledge of road construction. The one idea in road construction, as exemplified by the work of the roadmaster, has been to fill the gullies and level off the roadway with such material as might be closest at hand. The iniquitous system of "working out" the road tax still exists in most parts of the State. Under this law the services which are given, in lieu of taxation, are usually far from commensurate with the needs of the public. A new system must be substituted for this before we can expect to better the condition of the rural highways.

The problem of highway construction and maintenance differs somewhat between the country and city, although they are closely allied. The difference is only one of degree. The concentration of traffic on the business streets in the cities necessitates, as a rule, the construction of a more durable pavement than is demanded by the light traffic of the rural highways. The greater valuation which is attached to city property makes the burden of constructing the more costly pavement less, proportionately, than it would be to construct a less expensive pavement in the country.

The cities, towns and villages, however, are the places to which the people of the country must look for practical demonstrations in the science of road construction. Most Wisconsin cities employ competent engineers to superintend the construction of the pavements; and one may find in these cities, as a whole, nearly every important class of pavement. The Wisconsin municipalities are improving their streets so rapidly that the list of street pavements given in this report will be very incomplete when it comes from the press. The improvement of the city and town streets naturally precedes that of the country highways, and it may be some years before the country roads are to any extent permanently improved.

The chapters of this report contain discussions of the various materials now used in the constructions of pavements; of the methods of constructing the different pavements, and of the experience of the different Wisconsin cities in the use of these pavements. Under each county, besides a discussion of the city street pavements, there is a short description of the soils, surface configuration and road metals. The reader will be able to glean from these pages many suggestions which will assist him in securing better pavements for Wisconsin highways.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
Letters should be addressed to the MANAGING EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.

Wire-Rope Tramways.

The Editor:

Sir.—In your issue of August 22 there is an article "Across the San Juan Mountains," by T. A. Rickard, in which are mentioned some aerial wire-rope tramways, and in this connection my firm desires to call your attention to the improvements that have been made in the single-rope system, and also in the double-rope system. Mr. Rickard refers to the Huson and Hallidie systems as being typical of this style of single rope tramways, and speaks of them as being obsolete, etc. Whereas this is true of the old Huson and Hallidie tramway, we are building a single-rope tramway of which this is not at all true, although we have built but few east of the Rockies. We have, however, in the last few years furnished a great many of our improved single-rope tramways ranging in capacity from 5 to 20 tons per hour, and from 1,500 to 25,000 ft. in length, and with spans up to 2,000 ft.

We have furnished one single-rope tramway with a capacity of 20 tons per hour, which is one of the longest and heaviest tramways in the country, being approximately 5 miles in length, with a fall of 4,200 ft. The cost of delivering ore on this tramway is about 18c. per ton, which includes labor and renewals and repairs. As the tramway is divided and operated in two separate sections, one of which is about 2⅛ and the other 2⅝ miles, this low cost is not the result obtained from the operation of a long tramway in comparison with a short one; so the cost of operation of the double-rope tramway of the Bleichert system, 10,000 ft. long, at about 19c. a ton, is very high in comparison with our improved single-rope tramway, and also in comparison with the latest improved and best type of double-rope tramways. Our improved double-rope tramway would make the cost as low as, and in most cases lower than, the single rope.

Mr. Rickard's statement that the use of a single-rope tramway is limited, is correct, depending on the contour of the country and capacity required.

Our improvements are as follows: Buckets are automatic in loading and unloading, thereby reducing the labor to a minimum, which is also the case as to renewals and repairs, through parts being perfected so that they are subject to little wear.

ARTHUR PAINTER.

San Francisco, August 27, 1903.

Relative Value of White Lead and Zinc White.

The Editor:

Sir.—In your issue of August 8 you publish a short paragraph under the title of "Relative Value of Zinc White and White Lead." In this short article you refer to a note in the *Comptes Rendus*, 1903, in which J. L. Breton reports the results of his investigations as to the relative value of zinc white and white lead as pigments.

I trust that you will pardon me in saying that the conclusions given in your condensed abstract are somewhat different from what an intelligent reader would arrive at with the whole note of M. Breton before him. On the question of the covering power of oxide of zinc as compared with that of white lead he states:

Translation.—"Proceeding on a basis of equal weights, we have been able to demonstrate that the covering power of oxide of zinc is almost double that of white lead, and that the covering power of

lithophone is about one-third greater than that of lead carbonate. Taking equal volumes, the covering power of oxide of zinc is still very superior to that of white lead; but, in view of the fact that in equal quantities the former of these bodies forms with the oil a mixture of thicker consistency, it becomes necessary for use to have the zinc white paints thicker in order to obtain the same results."

It will be noted here that he qualifies his statements, to the effect that in using the zinc white paints they must be applied thicker (than white lead) in order to obtain the same results (as with white lead). This is the whole matter in a nutshell. The average painter mixes his paint to such a consistency that it can be applied without showing brush-marks and with reasonable ease. The thicker paint referred to by M. Breton, if simply a mixture of zinc and linseed oil and with no barytes or other "inert pigment" present, would in the ordinary painter's hands show brush-marks and be very difficult to apply. Following his usual practice, he would add oil until the paint could be applied without the appearance of the brush-marks; and, when this oil was added, the zinc paint would spread out so thinly that it would cover poorly.

This is not intended as a criticism of zinc white as a paint material, but simply to correct the impression your abstract would tend to convey to the casual reader.

G. W. THOMPSON.

Brooklyn, N. Y., Sept. 4, 1903.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

TAXATION OF COMPANY'S PROPERTY IN DIFFERENT STATES.—The Portland Gold Mining Company, owning and operating mining property in the Cripple Creek district in Colorado, is incorporated under the laws of Iowa, its office in that State and nominal principal place of business being in Council Bluffs, in Pottowatamie County. The treasurer of that county brought suit to compel the company to produce its books, so that the names of stockholders and the amount of their holdings of stock could be ascertained; the object being to compel the company to pay the county full taxes on its Colorado property. The company pleaded in reply that, as it was assessed for taxes in Teller County, Colorado, where the actual property was situated, it was not liable for taxes on the same in Iowa. On August 29 the court rendered a decision sustaining the position of the company and practically non-suiting the county. This decision is of interest to all mining companies operating in a State other than that in which they are incorporated.—Treasurer of Pottowatamie County, Iowa, v. Portland Gold Mining Company; First District Court of Iowa.

QUESTIONS AND ANSWERS.

Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc.; preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert, nor can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preference will, of course, always be given to questions submitted by subscribers.

Iron Oxide.—I shall feel obliged if you will oblige me. What quantity of metallic paint is consumed in the East per annum and the price of high grade iron oxide at New York, also the name of purchasers? —G. W.

Answer.—The consumption of iron oxide paints since 1900 has fluctuated with the variable quality of the ore produced and prices asked. In 1902 the output of metallic paints in the United States (exclusively of mortar colors) amounted to 18,220 short tons, which compares with 15,915 tons in 1901 and 23,218 tons in 1900. The principal producing States were New York, Pennsylvania and Tennessee. The value of metallic paint at New York at the present time is about $19 per short ton of 2,000 lb. for brown and $16 for red. Leading dealers are J. W. Coulston & Co., 140 Maiden Lane, N. Y., and the S. P. Wetherill Company, 100 William street, New York.

Canvas Tables.—Where are canvas tables used in the United States? Where can any information be obtained concerning them?—H. H.

Answer.—In further answer to this question, which was published in the ENGINEERING AND MINING JOURNAL for August 8, the Mines Equipment Company, of San Francisco, Cal., writes us that the Gates system of canvas and slimes plants, which is manufactured by the company, is in use at a number of well-known mines, showing that the opinion of mining men on the Pacific Coast, with regard to the plants of this type, is a very good one. Among the mines using these plants are the Kennedy and the Zeile in Amador County, Cal., each having a daily capacity of 140 tons; the Empire and the Champion in Nevada County, each a 100-ton plant; the Pennsylvania and the W. Y. O. D. in the same county, each a 50-ton plant; the Mountaineer, a 40-ton plant. The Confidence and the Jumper mines, in Tuolumne County, have also plants of this kind, each of 50 tons capacity. In Colorado the Smuggler Union and the Liberty Bell have plants, each of 150 tons capacity. Our correspondent could doubtless obtain information from any of the companies named as to results, as well as from the manufacturers.

PATENTS RELATING TO MINING AND METALLURGY.

UNITED STATES.

The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the ENGINEERING AND MINING JOURNAL upon the receipt of 25 cents. In ordering specifications correspondents are requested to name the issue of the JOURNAL in which notice of the patent appeared:

Week ending August 12, 1903.

735,895. DRIER.—Joseph H. Morong, Virgilina, Va., assignor of one-half to Wm. D. Elger, New York, N. Y. In a drier, for ores and the like, the combination of an imperforate frame, a series of perforated sifting-pockets, means for agitating said pockets and frame, and a heating device located in operative relation to said frame and pockets.

Week Ending September 2, 1903.

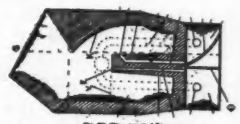
737,566. ELECTROLYTIC APPARATUS.—George Bell and George W. Bell, Liverpool, England. In an electrolytic apparatus, an electrolyzing-chamber having a mercury cathode and a suitable anode, an oxidizing-chamber communicating with the same at the lower part, through which communication mercury flows from one chamber to the other, a valve controlling the pressure of gas in one of said chambers, for forcing the mercury from one chamber to another, an electromagnet for operating said valve, and a liquid-metal-containing electric-contact vessel communicating with said valve-controlling chamber, whereby said pressure in said chamber acts on the liquid in the liquid-metal contact vessel, contacts disposed at different heights in said vessel, and electric circuits connecting the magnet-coil with the contacts and liquid in said vessel.

737,571. ROLL HEATING AND COOLING APPARATUS.—Charles W. Bray, Pittsburg, Pa., assignor to the American Tin Plate Company, Orange, N. J. A rolling-mill having a heating-burner arranged to heat one of the rolls, and a valved pipe connected to a source of gaseous supply and arranged to direct a cooling-gas upon the same roll body.

737,573. KILN.—Joseph Brownlow, Caton, England. In continuous kilns, a system of channels comprising a main channel, for each chamber two smaller channels leading into said main channel, apertures in the top of each chamber connected with one of the two smaller channels aforesaid, a metal nozzle-shaped tube introduced into the other of the said two smaller channels, one end thereof opening to the air, a metal nozzle-shaped tube or tubes introduced into the main channel.

737,577. CONVERTER FOR MAKING IRON AND STEEL.—Walter B. Burrow, Norfolk, Va. In a movable pivoted converter or vessel for making steel and malleable iron having a refractory wedge-shaped projection or tuyere-block opposite the pouring side, integral with and attached to the lining and suspended or overhanging more or less over the bottom or hearth of the converter, the lower end of the said wedge-shaped projection or tuyere-block having its bottom or thickest end at an angle from 30° to 60° to a line at right angles to the axis or trunnions of the converter, and the wedge-shaped tuyere-block having a flange or rim on its thinnest or upper end forming a recess or hollow in the direction of its length or height and a concavity in the direction of its width, or axis of converter and occupying the lining above the bottom and the thickest portion of the wedge-shaped projection near the axis of the converter opposite the pouring side.

737,578. CONVERTER.—Walter B. Burrow, Norfolk, Va. In a tilting, movable converter for making malleable iron and steel, having a vertical upward-tapering refractory tuyere wall or dam dividing the body of the converter into



737,578.

two separate halves, extending from side to side, attached to and forming a part of the lining parallel to the axis or trunnions of the converter and projecting upward from the bottom or hearth to or near the said axis.

737,579. PROCESS OF PURIFYING GAS.—Ernst Burschell, Laudau, Germany. A process for separating hydrogen sulphide from gases, which consists in treating the gas with a solution containing an iron salt and the salt of a metal having a greater affinity for hydrogen sulphide than said salt and sulphide of which is decomposed by the iron salt.

737,595. APPARATUS FOR COATING METAL PIPES OR CONDUITS.—Thomas E. Dwyer, Wakefield, Mass. An apparatus, comprising an elongated tubular guide formed to receive a pipe to be lined, means for heating said guide, a lining-forming mandrel, and means for supporting the mandrel within the pipe.

737,618. APPARATUS FOR COATING METAL PIPES OR CONDUITS.—George W. Harrington, Wakefield, Mass., assignor to Thomas E. Dwyer, Wakefield, Mass. An apparatus comprising a tank adapted to contain a melted metal or alloy and having a tubular outlet, a lining-forming mandrel within said outlet, and a stop located outside the tank and arranged to bear against the outer end of the mandrel.

737,625. PROCESS OF MAKING SULPHURIC ACID.—John B. F. Herreshoff, New York, N. Y., assignor to General Chemical Company, New York, N. Y. A method of making sulphuric acid, which consists in causing liquid sulphuric acid and gaseous sulphuric anhydride to travel in opposite directions in contact with each other, reserving a portion of the strong acid thus produced as the final product of the process, diluting and cooling the remainder of the strong acid, and returning such diluted and cooled acid to the first stage of the process to again absorb the anhydride.

737,740. PROCESS OF PRODUCING CAUSTIC SODA AND BARIUM SULPHATE.—Charles B. Jacobs, East Orange, N. J., assignor, by mesne assignments, to the United Barium Company, Jersey City, N. J. A process of producing caustic soda and artificial barium sulphate from native sodium and barium compounds, which consists in subjecting native barium sulphate in the presence of carbon to heat sufficient to reduce the same to barium oxide, barium sulphide and sulphur dioxide, treating the barium oxide and barium sulphide with water to produce barium hydrate, treating sodium chloride with the sulphur dioxide in the presence of water and oxygen to produce sulphate, then treating the barium hydrate with the sodium sulphate to produce caustic soda and barium sulphate.

737,626. APPARATUS FOR MANUFACTURING SULPHURIC ACID.—John B. F. Herreshoff, New York, N. Y., assignor to General Chemical Company, New York, N. Y. In a plant for the manufacture of liquid acid according to the absorption process, the combination of an absorber, having an inlet for the absorbing medium and another inlet for the medium to be absorbed, also an outlet for the absorption product, a tank for receiving the absorption product, a regulator-tank arranged to receive a portion of the absorption product, a valve controlling the outflow of the remaining portion of the absorption product from the receiving-tank, means controlled by the variations in the level of the liquid in the regulator-tank, for governing the said valve, means for diluting that portion of the absorption product which passes to the regulator-tank, a supply-tank connected to the absorber to supply the absorbing medium thereto, and means for transferring the liquid from the regulator-tank to the supply-tank.

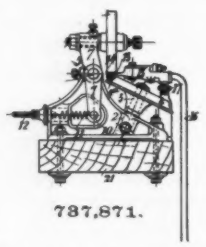
737,750. BALL GRINDING-MILL.—Povl T. Lindhard, New York, N. Y., assignor to F. L. Smidth & Co., Copenhagen, Denmark. In a ball grinding-mill, a drum, a spider supporting the drum, said spider having near the axis of the drum hollow arms communicating with the interior of the drum with openings between them, pipes adapted to receive the partly-ground material from the periphery of the drum and deliver the same again to the drum through the hollow spider-arms, and means to deliver fresh material to the drum through said openings.

737,830. HOIST.—Otho C. Duryea and Morris C. White, Los Angeles, Cal. A base, a webbed drum mounted on the base, a band-wheel on said drum, an intermediate webbed band-wheel, gearing connecting the two band-wheels, said gearing being between the web of the drum and the web of the intermediate band-wheel, a friction-band on each band-wheel, means for tightening one friction-band, means independent of the first means for tightening the other friction-band, and means for driving the gearing.

737,841, 737,842 and 737,843. BRICK-MAKING MACHINE.—Wallace A. Houts, Oakland, Cal. The combination in a brick-making machine of a rotatable table or drum; molds in said table; means for delivering material into said molds; movable closures for the molds, said closures each having a transverse slot in one end and a pin on the table operating in said slot; plungers reciprocating in the molds to compress the material, and means for delivering the finished bricks from the molds.

737,866. INDICATOR FOR LOCATING SUNKEN METALS.—Charles F. Pike, Philadelphia, Pa. An apparatus comprising an open-bottom cylinder adapted to be suspended from a vessel, an indicator-bar pivotally mounted therein, a magnet on said bar, and means, on board the vessel, for indicating the position of the bar.

737,871. AERIAL ROPEWAY.—John P. Roe, London, England, assignor to the Ropeways Syndicate, Limited,



737,871.

London, England. An aerial-ropeway guide comprising a guiding-sheave arranged to solely support the rope, and a depression-heave for normally holding the rope in proper position on the guiding-sheave.

737,882. PROCESS OF ELECTROLYTICALLY PREPARING LITHOGRAPHIC PLATES.—Otto C. Strecker, Darmstadt, Germany. A process for preparing metal plates or alloys for lithographic and printing purposes, consisting in submitting the plate, as one of a pair of electrodes, in electrical connection through a suitable electrolytic, to the action of an alternating current, by which a layer of oxides is formed on the metal, and then transforming said layer by chemical means into an insoluble layer of salts adhering firmly to the metal.

737,901. TREATING AIR FOR USE IN CONNECTION WITH THE MANUFACTURE OF GAS.—John A. Bower, Waukegan, Ill., assignor to Practical Gas Construction Company, North Chicago, Ill. In a machine for manufacturing gas the combination of an aerometer and pipe for the supply of air thereto and a regulator controlling said pipe and controlled by the movement of the bell of the aerometer, said regulator containing two weights which successively act upon the regulator-valve of the air-supply pipe.

737,911. DRILLING-MACHINE.—William M. Denning and Charles M. Denning, Tollgate, W. Va. A drilling-machine comprising a frame, a drill-rope reel mounted thereon, a bailer-rope reel mounted on said frame below the first reel, a friction-wheel carried by the outer end of the shaft of each reel on the outside of the frame, a brake-band having one end connected to the frame and passing around the upper friction-wheel, an intermediately-pivoted lever connected to the opposite end of said band, an intermediately-pivoted operating-lever, means for holding said lever in the adjusted position, a link connecting said operating-lever and the lever connected to the brake, a second brake-band connected to the frame and passing around the lower friction-wheel, an intermediately-pivoted lever carried by the opposite end of said band, an intermediately-pivoted operating-lever adjacent the first operating-handle, means for handling said handle a link connecting the second operating-handle and the lever carried by the lower brake band, a shaft having one end journaled in said frame, an intermediately-pivoted lever supporting the opposite end of said shaft, means for rotating said shaft, a friction-wheel carried by the shaft and adapted to engage either the upper or lower friction-wheel, and means supporting said rotating friction-wheel between and out of engagement with either the upper or lower friction-wheel.

737,930 and 737,931. METAL-EXPANDING MACHINE.—Gustav J. Holl, Cleveland, Ohio, assignor to Wm. G. Hurlbert and Evan J. Job, Niles, Ohio. In a metal-expanding machine, a series of rotary feeders having tangentially-arranged grippers designed to engage a sheet of metal and draw the same to the feeders.

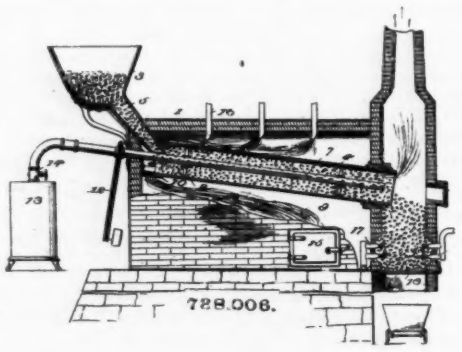
737,932. CENTRIFUGAL APPARATUS FOR PURIFYING GASES.—Herbert A. Humphrey, Westminster, England. A centrifugal apparatus comprising a casing divided into a plurality of communicating water-containing compartments, and a plurality of forwardly-propelling fans for the gas, one of said fans rotating in each of said compartments.

737,998. HOISTING MECHANISM.—Thomas H. Butler, Baltimore, Md. The combination, with a main driving-shaft, of two secondary driving-shafts, driving mechanism connecting the said shafts with the main shaft so that they revolve in opposite directions, two friction-wheels secured on the said secondary shafts, a winding-shaft, a friction-wheel secured on the said winding-shaft between the aforesaid friction-wheels, and means for sliding the two said friction-wheels alternately into engagement with the said friction-wheel between them.

738,001. CASING-HEAD FOR OIL-WELLS.—John Cochran, Bealls Mills, W. Va. The combination of a casing-head composed of two separate parts the one fitting above the other, said parts being fastened together, both of said parts being provided with a vertically-arranged perforation, and the lower of said parts being cut away for the passage of a rack, and the upper part fitting over the lower part so as to leave a recess into which said rack may slide, with a perforated tube-ring secured in the upper part of said casing-head, screws securing said tube-ring in place, a packing between said tube-ring and the upper part of said casing-head, a rack mounted between the parts of said casing-head, said rack being provided with downwardly-extending teeth, a toothed pinion mounted in a recess in the lower part of said casing-head and engaging with said rack, a hand-wheel for operating said pinion, and means for preventing the oil from leaking out around the shaft of said pinion.

738,004. GAS-PRODUCER.—John S. Daniels and Frederic L. Daniels, Stroud, England. In a gas-producer the combination with the producer-chamber, of a hollow perforated conduit having communication with the upper part of the producer and arranged to support fuel and to deliver distillates thereto, and inclined pivoted fire-bars each side of said conduit.

738,006. APPARATUS FOR REDUCING AND CONCENTRATING ORES.—Oliver B. Dawson, Caldwell, N. J. A furnace for reducing mineral in ore, having a reducing-chamber, through which the ore is passed, means for heating the ore in such chamber to the temperature of



738,006.

incandescence, means for introducing a reducing-gas into such chamber, the products of said heating means intermingling with said reducing-gas within such chamber in the presence of the ore therein for reducing the mineral in such ore to a metallic spongy condition, and means within the furnace adjacent to the discharge end of the reducing-chamber for concentrating the minerals into metallic globular formation after they leave such chamber.

738,007. PROCESS OF REDUCING MINERALS.—Oliver B. Dawson, Caldwell, N. J. A process for effecting the direct decomposition of minerals, and the conversion of the same into globular shot-like masses or nuggets, consisting in subjecting the ores without the addition of any flux thereto, and while atmospheric air is excluded therefrom, to a continuously-applied external heat for heating the ores to about the degree of beginning of incandescence in the presence of hydrogen gas supplied in quantity in excess of that required for hydrogenizing the elements naturally and previously combined with and extracted from the metals, such excess gas serving to maintain the metal in a metallic spongy condition and preventing the formation of oxides, carbonates, etc., and while still in a metallic, spongy condition, and in the presence of hydrogen gas concentrating the metals in the gangue to globular, shot-like masses or nuggets by subjecting them to a still higher degree of heat in a practically air-tight chamber.

738,013. APPARATUS FOR REMOVING MATERIAL FROM PILES.—James M. Dodge, Philadelphia, Pa., assigor to the Dodge Coal Storage Company, Naugatuck, Conn. The combination in an apparatus for removing materials from piles, a piling-floor, a movable structure having an extension and an elevated hopper, said extension arranged to travel over the piling-floor, conveying mechanism carried by the movable structure and arranged to transfer material received from the pile on the piling-floor to the elevated hopper.

738,067. MACHINE FOR PROFILING NON-CIRCULAR TUBES OR RODS.—Jaques Reimann, Plasmarl, near Swansea, England. A feed device for profiling non-circular tubes or rods by step-by-step motion, comprising a work-piece holder, a spindle for rotating the holder and a releasable connection between the holder and the rotation-spindle, in order to break the connection between the rotation-spindle and the holder at the completion of the partial rotation of the holder after each reduction pass and means for preventing further rotation.

738,076. DELIVERY MECHANISM FOR ORE-BINS.—John W. Seaver, Cleveland, Ohio, assignor to the Wellman-Seaver Engineering Company, Cleveland, Ohio. The combination of a storage-bin with an inclined delivery-spout having a perforated transverse bar therein, and a series of pins passing through the perforations of said bar and constituting a grated valve for governing the flow through the spout.

738,090. APPARATUS FOR COMPRESSING AND DRYING PEAT INTO BLOCKS OR PEAT.—Frank White, Toronto, Canada, assignor, by direct and mesne assignments, to himself, and George Alexander Griffin, Guelph, Ontario, Canada. An apparatus for compressing and drying peat into blocks comprising a traveling carrier which is movable stepwise, a series of inclosed molds, provided with heaters, connected to the carrier and movable with relation thereto for charging and discharging in the interval between the steps, and compression devices arranged to hold the series of molds under a regulable pressure during the travel of the carrier.

738,094. ELECTROLYTIC PROCESS.—Arthur Richaux, Brussels, Belgium, assignor to the Solvay Process Company, Syracuse, N. Y. An electrolytic process for the decomposition of chlorides and other salts, the same consisting in introducing into two layers of a solution of the chlorides or other salts respectively, a quantity of salt which will serve to maintain the lower layer of said solution in a condition of greater density and the upper layer in a condition of lesser density, the lower layer being in electrical contact with a cathode and the upper layer in electrical contact with the lower layer and an anode, and in passing an electric current through said electrodes and layers.

738,101. ROTARY FORCE-PUMP.—Homer P. Curtis, Denver, Colo., assignor of one-fourth to Glynn B. Stannard and John B. Waterbury, Denver, Colo. In a rotary force-pump, the combination with a casing having inlet and discharge openings, of a piston revoluble in the casing, impellers carried by the piston and journaled therein, the impellers being located in cavities formed in the piston, the latter having flanges at the ends closing the water-space between the piston and casing, said space communicating with the inlet and discharge opening of the casing, a key or abutment closing the water-space between the inlet and the discharge opening, and suitable means for automatically opening and closing the impellers at predetermined intervals, whereby the water is driven through the water-space in front of the impellers and out of the discharge-opening, and drawn into said space behind the impellers from the inlet-opening, said means being located in the chamber formed between the end of the piston and the end of the casing, and arranged to act on the impeller-journals which protrude into the said chamber.

738,135. PROCESS OF FORMING PEAT INTO BLOCKS FOR FUEL.—Frank White, Toronto, Canada, assignor, by direct and mesne assignments, to himself, and George Alexander Griffin, Guelph, Canada. A process which consists in inclosing the surface of a charge of moist peat, except at drainage points and applying heat to the inclosed surface to form a matte over the drainage-points.

738,136. BLOCK OF PEAT.—Frank White, Toronto, Canada, assignor, by direct and mesne assignments, to himself and George Alexander Griffin, Guelph, Canada. As a new article of manufacture, a block of peat consisting of a mass of compressed agglomerated peat having a jacket of greater hardness and density than the interior, which jacket is intersected, at predetermined points, by small and more permeable semiporous sections which act as vents for the egress of moisture or gas.

GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy:

Week Ending August 22, 1903.

19,113 of 1902. DIE FOR ROCK-DRILLS.—G. J. Glossop, Leeds. A special die, for the anvil block of hand or power hammers, for use in sharpening and mending rock-drills.

23,105 of 1902. MINER'S PICK.—J. Beeton and J. Wardall, Nottingham. An improved carrier for miner's pick blades and other tools.

13,570 of 1903. MAGNETIC CONCENTRATOR.—Bergman Electric Company, Berlin, Germany. An electromagnet for magnetic concentrators, having a core made in such a way that the coils may be wound on before the machine is put together.

13,812 of 1903. PIGMENT.—W. J. Ambruster and J. Morton, St. Louis, U. S. A. Making pigments by mixing salts of zinc and barium with sodium hydrate and carbonate of soda, and recovering the precipitated zinc hydrate and barium carbonate.

14,002 of 1903. ROCK-DRILL CHUCK.—F. Henderson, Johannesburg, South Africa. Improved chuck for rock drilling machines.

TO TRAVELING ENGINEERS.

A room for the exclusive use of visiting engineers is maintained at the New York office of THE ENGINEERING AND MINING JOURNAL. Visitors to the metropolis are cordially invited to take advantage of the facilities it offers, by having their mail addressed in care of the JOURNAL and making its office their headquarters. The managers of the branch offices will also be glad to welcome visiting engineers and to be of any service to them that they can.

We are informed that the Institution of Mining and Metallurgy offers to all members of the American Institute of Mining Engineers non-resident in Great Britain, the privilege of free use of the Institution offices and library at Salisbury House, London Wall, E. C. Visiting engineers may have their letters addressed to the offices of the Institution and thus enjoy the advantages of temporary office accommodation in the city of London.

PERSONAL.

Mining and metallurgical engineers are invited to keep THE JOURNAL informed of their movements and appointments.

Prof. Henry Louis is at Kaafjord, in Norway.

Mr. Horace V. Winchell has gone to western Oregon.

Mr. George C. Hazelet, of Valdez, Alaska, is in New York.

Mr. Nelson Fell, of London, is now at Bayandy Kuduk in Siberia.

Mr. H. P. Shaner, of Newcastle, Pa., has been in Gilpin county, Colo.

Dr. J. W. Smith, of Baltimore, Md., has been in the Russell district, Gilpin county, Colo.

Mr. I. S. Lydecker, of New York City, is now developing coal lands in Isham, Tenn.

Mr. Joseph Meredith is superintendent of the New Year Gold Mines Company, at New Year, Mont.

Mr. H. De Quinly has resigned as superintendent of Mine la Motte, and has returned to St. Louis, Mo.

Mr. A. A. Burmond, chemist of the Small Hopes Company, of Leadville, Colo., has gone to Kingman, Ariz.

Prof. F. W. McNair, president of the Michigan College of Mines, was in New York City on September 8.

Mr. R. J. Grant, of Denver, has gone to Nova Scotia and expects to be in New York for the Institute meeting.

Mr. L. Goldsmith has returned from Colombia, S. America, where he has had charge of a hydraulic property.

Mr. Henry F. May, of Denver, returned from England by the *Mayflower*, which reached Boston on September 5.

Mr. P. B. Hicks, of Central City, Colo., has gone to Rosedale, N. M., to take charge of a mine for New York men.

Mr. W. C. Hammatt has accepted the position of engineer with the Mountain Copper Company, of Keswick, Cal.

Mr. Percy L. Fearn, consulting engineer to the White Knob Copper Company, has returned to Mackay, Idaho.

Dr. E. R. Buckley, the state geologist of Missouri, was married August 28, at Milwaukee, to Miss Grace Magdeburg.

Mr. Silas Wright is resident engineer and manager to the Cauca Valley mines in the district of Canceres, in Colombia.

Mr. J. W. Norton, of the Pine Mountain Company, has returned from New York to Lynx creek, Yavapai county, Ariz.

Mr. J. W. Mercer and Mr. Wm. A. Kissam will reach New York, on their return from Colorado, about September 15.

Mr. Frank Klepetko is in Montana this week, on his way to New York. He has been in Mexico on professional business.

Mr. Frank Nicholson has been in southwest Wisconsin making a critical examination of the ore deposits in that state.

Prof. H. A. Wheeler, of St. Louis, is making a trip through the East in behalf of the mining department of the World's Fair.

Mr. Frank C. Young, president of the Gunnell Gold Mining and Milling Company, has returned to Denver after a trip to Europe.

Mr. H. F. E. Gamm, manager of the Ontario Mining and Smelting Company, of Bannockburn, Ont., has been in New York City.

Col. Robt. M. Thompson, president of the Orford Copper Company, arrived from London by the *Deutschland* on September 8.

Mr. John Hays Hammond has returned to New York, from Gloucester, Mass., having recovered from a rather protracted indisposition.

Mr. George H. Robinson, of Butte, Mont., and Mr. Henry Stern, of New York, recently visited the Brittania mine on Vancouver Island.

Mr. Hal W. Hardinge, of Denver, has gone from London to Spain, on professional work, and is expected in New York about October 15.

Mr. Edward S. Farrow, of the Engineering Company of America, has been investigating the Oriskany iron deposits in Appalachian Virginia.

Mr. R. E. Nelson, superintendent of the Clear Creek Mining and Reduction Company, in Gilpin county, Colo., has been on a trip to New Mexico.

Mr. T. Godbe arrived at Salt Lake City recently from Los Angeles to visit Pioche and De Lamar, Nev., where he will meet Mr. Simon Bamberger.

Dr. Theodore Comstock, of Los Angeles, Cal, is now consulting engineer of the Carmen Copper Company, of New York, with properties in Durango, Mex.

Mr. John Dern, president of the Consolidated Mercur Company, recently left Los Angeles for San Francisco, en route to Portland and Salt Lake City.

Mr. David H. Lawrence has been appointed assistant superintendent of the Gothic Milling, Mining and Coal Company operating in Gunnison county, Colo.

Mr. E. G. Banks, superintendent of the Waihi gold mine in New Zealand, has lately been visiting a number of cyanide plants in Colorado, Dakota and Utah.

Mr. Hudson H. Nicholson, of Denver, recently returned from a long professional trip to Oregon and has attended the Mining Congress at Deadwood, S. D.

Col. H. H. Gregg, of Joplin, Mo., is arranging for the exhibition of a Missouri lead and zinc mine as part of the state exhibit at the St. Louis World's Fair.

Prof. Lionel L. Tovey, of the Tomsk Technological Institute, sailed from New York on September 8, after a thoroughly enjoyable journey through our mining regions.

Mr. Winthrop W. Fisk has left Boston for Sinaloa, Mex. He will examine mines along the new Kansas City, Mexico & Orient Railroad, and his headquarters will be at Choix.

Mr. John Cox, who is in the employ of the Wassau Gold Mining Company, Limited, of London, Eng., in the Congo State in Africa, has been in Colorado during the past month.

Mr. T. H. Oxnam, of Los Angeles, has returned from Esmeralda county, Nevada, and has gone to Chinipas, in Chihuahua, Mexico, where he will be until the end of October.

Mr. Nathan Hirsch, of New York City, accompanied by his attorney, Mr. D. L. Webb, of Denver, has been visiting mines in the Wisconsin district, in the northern section of Gilpin county, Colo.

Dr. Oskar Nagel has established an office and laboratory at 90-96 Wall street, New York. Dr. Nagel will act as a chemical engineer, consulting chemist and chemical counsel in patent cases.

Mr. George E. Moulthrop, who has been on the engineering staff of the Boston & Montana Company, at Butte, for several years, has been appointed foreman of the Pennsylvania mine, in place of Mr. Adams.

Mr. W. Randolph Van Liew has resigned the superintendency of the Old Dominion Copper Company. He left London recently en route to south Russia to become manager of the Caucasus Copper Company.

Mr. Richard Eames, Jr.,, accompanied by Mr. W. S. Blackmer, of Salisbury, N. C., has gone to the state of Jalisco, Mex., where Mr. Eames is consulting engineer for the La Fortuna Mining Company, of New York.

Mr. William S. Ward, field commissioner for the Department of Mines and Metallurgy of the World's Fair, has returned to St. Louis from a trip which took in most of the mining states and territories of the West.

Mr. M. D. Draper, for the past three years superintendent of the Town Topics Gold Mining Company, operating near Central City, Colo., has gone to California to examine mining property near the Mohave desert.

Mr. A. E. Wheeler has been appointed superintendent of the Great Falls works of the Boston & Montana Company. This is an important appointment. Mr. Wheeler is a graduate from the Massachusetts Institute of Technology.

Mr. B. H. Dunshee, who has been filling the position of superintendent of the Boston & Montana mines for the last 1½ years, has been appointed assistant superintendent of the mines of the allied companies in Butte, and will assist Mr. Gillie.

Mr. Henry Marcco, connected with the German railroad commission; Mr. Carl Dresler and Mr. Albrecht Marcco, in the service of the Prussian government, have been visiting the Mesabi range recently, studying American mining methods.

Mr. S. Sykes, of Johannesburg, has been in Denver, Colo., making arrangements with the George J. Leyner Engineering Works Company, of Denver, for the sale throughout South Africa of the air compressors and rock drills manufactured by that firm.

Mr. J. C. Adams has been appointed superintendent of the mines of the Boston & Montana Company, succeeding Mr. Dunshee in that position. For the last 1½ years Mr. Adams has been foreman of the Pennsylvania mine, one of the principal properties of the company.

Mr. John Gillie, who is general superintendent of the mines of the Amalgamated Company at Butte, and is also assistant to Mr. Scallon in the management of the Anaconda properties, has been east on a visit to his old home and also to New York. He returned to Butte on September 2.

Mr. William McMaster, of Montreal; Mr. Frederic Nichols, of Toronto, and Mr. W. B. Ross, of Halifax, have been appointed a committee to manage the affairs of the Dominion Iron and Steel Company and the Dominion Coal Company, pending a readjustment of the existing operating agreement. No successor has yet been elected to succeed Mr. James Ross.

Mr. Albert Ladd Colby, for the past 10 years, metallurgical engineer of the Bethlehem Steel Company, has accepted the position of assistant to the president of the Orford Copper Company, which is one of the constituent companies of the International Nickel Company. Mr. Colby's duties will be chiefly in connection with the manufacture and applications of nickel steel.

INDUSTRIAL.

The United Mines Company of Boise, Idaho, recently placed an order with the Colorado Iron Works of Denver for a 50-ton Chilean mill.

The Pittsburg Gas Coal Company has awarded a contract for two 500-h. p. engines to the Harrisburg Foundry and Machine Works, Harrisburg, Pa.

The Sullivan Machinery Company, of Chicago, recently sold the Junction Development Company, of Bisbee, Ariz., a Sullivan diamond drill with a capacity of 1,500 ft.

The Bodie Mining Company of Bodie, Wash., recently purchased a 50-ton Allis-Chalmers amalgamation-cyanide plant through the Bradley Engineering Company of Spokane.

Fogarty & Dickinson, of San Luis Potosi, Mex., have contracted with the J. H. Montgomery Machine Company, of Denver, Colo., for hoisting machinery and other mining equipment for a Chihuahua mining company.

The American Spiral Pipe Works, of Chicago, has received an order from the Newhouse Mining and Smelting Company, of Salt Lake City, with properties at Frisco, Utah, for 8 miles of 12 by 14 spiral riveted pipe.

The Automatic Haulage Company of Terre Haute, Ind., operating works in Indiana and Illinois, expects to erect shops in Terre Haute for the manufacture of an automatic endless rope haulage for use in mines and quarries. A. D. Scott is president.

The Laidlaw-Dunn-Gordon Company's plant at Tweedvale, Ohio, has just completed two 6,000,000-gal. pumping engines of the crank and fly-wheel type, to ship to Yorkshire, Eng. They are 3-cylinder compound engines with Corliss valve motion.

G. W. Price & Co., consulting and contracting engineers, have removed their San Francisco offices to 523 Market street, and will occupy two floors of that building. The firm states that it has been obliged to get larger quarters, owing to the demand for its high-duty pumps.

The Utah Mining Machinery and Supply Company of Salt Lake City has furnished six compressor plants for mining companies in Utah, Nevada and Idaho in the last 30 days. The company sold a 125- h. p. boiler to the White Knob Copper Company of Mackay, Idaho, recently.

The Ingersoll-Sergeant Drill Company is pushing work on its foundry at Phillipsburg, N. J., and has given out the order for the cranes, etc. The company has placed an order for two large boring mills with the Niles-Bement-Pond Company. The remaining orders for the machine shop will probably not be given for some time.

The Loomis-Pettibone Gas Machinery Company, it is stated, has purchased the mining machinery plant of the Holthoff Machinery Company at Cudahy, Wis. The company some time ago purchased a large plot of ground at Linden, N. J., for the erection of a plant. All the men who had the proposed Linden plant in charge have gone to the Holthoff plant.

The Cassel Automatic Water Motor Company, of Seattle, Wash., has recently received orders from the Daly Reduction Company, of Hedly, B. C., for a 24-in. and a 36-in. self-governing wheel. The wheels will

drive a 100 kw. direct-connected generator, and will operate under 400-ft. head. The Cassel Company is also at work upon a number of contracts for wheels of their self-governing type for various sections of the States.

The Western Electrical Supply Company, of St. Louis, Mo., has divided its business into two parts. It retains that part relating to the building of electric light plants and electric railroads, but has disposed of the part relating to electric car supplies to the Wesco Supply Company, which will carry on the business at Seventh street and Clark avenue. H. K. Gilman, president of the Western Electrical Company, will be a director of the Wesco Company.

The coal-handling machinery installed by the C. W. Hunt Company, West New Brighton, N. Y., at the Lincoln wharf power station of the Boston Elevated Railroad Company recently raised coal 90 ft. above tide water and delivered it to the storage pockets at the rate of 520 tons per hour. The installation follows in general design the standard Hunt steeple tower rig, the moving gear and coal cracker being electrically driven and the hoisting engine direct-connected. The overhang of the folding boom is 40 ft., and the capacity of the shovel two tons.

The Erie Railroad Company has appointed Luis Jackson industrial commissioner, with headquarters at 21 Cortlandt street, New York. The railroad is seeking to increase the number of manufacturing plants along its line and develop the resources of its territory. Data on the material resources and advantages for manufacturing on the Erie system are now being compiled for distribution. Among other natural resources of the Erie territory are anthracite and bituminous coal, natural gas, petroleum, fire and other clays, cement material and building stone.

President Duntley, of the Chicago Pneumatic Tool Company, states that he is not going to resign. Mr. Pam resigned from the directory because he had sold all his stock to Mr. Schwab, who is now the largest stockholder. The executive offices of the company are to be moved to New York, and to this change is due the resignation of Messrs. Walker, Chalmers and Lynch from the directory and the executive committee. The number of directors will probably be reduced from fifteen to nine. The various plants of the company are working increased forces and the business for August exceeded that for August, 1902.

The firm of Arthur Koppel has been awarded a contract for building and equipping a narrow-gauge railroad about 400 miles long, by the Otavi Mining and Railroad Company. The railroad is to be used in the service of the copper mines in the Otavi and Taumeb district in southwestern Africa. The total cost of building the road is approximately $4,500,000. The firm of Arthur Koppel has formed a company with several of the first German banks, to build this road, which has to be finished within 2½ years. Arthur Koppel builds and equips the road complete, including rails, steel ties, rolling stock and all the other equipment. By one of the last steamers 15 engineers of the firm left Hamburg for southwestern Africa to begin work.

Among recent shipments of the various machines made by the American Concentrator Company, of Joplin, Mo., may be mentioned the following: New Century jigs, rolls and ore feeders to the Missouri Copper Mountain Mining Company, Sullivan, Mo., and the Holdston Zinc Company, Mascot, Tenn.; New Century jigs to the Tybo Mining and Reduction Company, Tybo, Nev.; Whitepine Mining Company, Sargents, Colo., and to the Holthoff Machinery Company, for the Old Dominion Copper Mining and Smelting Company, of Globe, Ariz.; eight large coal washing jigs for jigging anthracite coal for the Delaware & Hudson Company, to be used in the Plymouth No. 2, Carbondale and Wilkes-Barre breakers. The Delaware & Hudson Company decided to adopt these machines after a most thorough trial of one at the Plymouth No. 2 breaker.

TRADE CATALOGUES.

The W. J. Clark Company, of Salem, O., sends out illustrated cards describing its "Quick as a Wink" hose coupling, for use with pneumatic tools. These couplings are stated to be tight under any pressure, while they can be connected and disconnected in one-tenth the time required for screw couplings.

The Haywood Company, of New York City, issues an illustrated circular of 30 pages describing the Haywood orange peel and clam shell buckets for handling broken rock, boulders, coal, sand, gravel, and for general excavating purposes. The company makes dredges, skid excavators, steel traveling derricks, stationary steel derricks, unloading bridges and mast and gaff derricks. The catalogue is neatly printed and illustrated.

The American Well Works, of Aurora, Ill., issues Form 89, a pamphlet containing selected pages from its last catalogue of well-sinking machinery. The pamphlet contains illustrations and prices of the company's horse power Lightning jetting well sinking rig for sinking tubular wells to any depth down to 500 ft. through ordinary soft formations or soft rock, and gasoline engine jetting rigs for the same purpose. For deeper wells the company makes rigs using the Lightning revolving hydraulic process. By this process a well was sunk in alluvial deposits on Galveston Island to a depth of 3,067 ft. The company also makes revolving rigs for lighter work and elliptical drilling machines using gasoline or oil engines for sinking wells to depths 1,000 ft. or less; also well augur outfits for sinking shallow wells.

SPECIAL CORRESPONDENCE.

Butte. Sept. 5.

(From Our Special Correspondent.)

It is thought now that the mines of the Amalgamated Copper Company and the Washoe Smelter will resume work on or about September 12. There is no question but that the production of ore can start as soon as the smelter is ready. The manner of making the flue connections with the various departments at the Washoe works will considerably increase the daily capacity. Besides the construction of the large flue, several other features have been added. F. Aug. Heinze is making the best of his opportunity at the Minnie Healey; ore is hoisted from all three compartments of the main shaft. The shaft has two hoisting compartments and a pump compartment, but as the Minnie Healey is drained by the Leonard shaft, which is close by, Heinze has practically no pumping to do, therefore, a cage and independent hoisting rig has been put to work hoisting through this latter compartment, adding greatly to the capacity of the shaft.

The interest of this State in the American Mining Congress has not developed as much strength as one would suppose. While Montana has a very kindly feeling for the Black Hills and wishes the two camps of Deadwood and Lead all the success imaginable with the meeting, it appears now that but few Montana men will be in attendance, partly owing to a lack of concerted action on the part of those who should take the lead in the matter. What is needed is a state association among the mining men of the State. An organization, founded somewhat on the lines of the Black Hills Mining Men's Association, which would meet, say, monthly or so, should be conducive to mutual benefit. The State organization could furnish delegates for the National Mining Congress, securing delegates, representative of the interests involved or advanced. There is a movement on foot here for such an organization.

Denver. Sept. 5.

(From Our Special Correspondent.)

At Idaho Springs, Clear Creek county, the protracted strike has proved a failure. A committee from the local miners' union met the executive committee of the Citizens' Protective League on September 1, and offered to terminate the strike, if the mine operators would employ the union miners now out of work. The committee said these miners were without means of support and were unable to secure work owing to the stand taken by all the mine owners of the district. The executive committee of the Citizens' Protective League stated its ultimatum: (1) That the strike should be declared off at once; (2) that the local union should surrender its charter and disband; (3) that the members of the Western Federation of Miners should assist in bringing to justice the men whom the Federation is supposed to be shielding and are wanted in connection with the plot to blow up the Sun & Moon mine. Two of the men are J. E. Chandler, the former financial secretary of the local union, and D. C. Copley, member of the State executive committee of the Western Federation of Miners. The Citizens' League committee also informed the union committee that, so far as the mines were concerned, the strike was already over, as every mine was working with an ample force of non-union men and the district was now strictly non-union. The union committee admitted this and said it realized the strike was lost some time ago. The capitulation of the small remnant of the local union has been hastened by the Western Federation of Miners notifying it of the inability of the Federation to continue strike pay after September 1.

The Standard mill of the United States Reduction & Refining Company at Colorado City closed down on September 2 from lack of ore, a direct result of the strike. About 150 men are thereby thrown out of employment, but the management will pay them one-third their wages for an indefinite period, according to a promise given at the time of the strike last spring.

On August 29 two-thirds, or about 175, of the employees of the Durango plant of the American Smelting and Refining Company went out on strike. The Citizens' Alliance of Durango assured protection to all who desired to work in any event. The smelter force has increased since, 125 men going to work on the day shift. Present indications are that the strike is a failure, and that the plant will continue in operation, with an ample supply of ore from around Silverton. Frank Smelcer, president of the San Juan district union (successor to St. John, who is a fugitive from justice), was arrested in Durango on a charge of carrying concealed weapons, pleaded guilty, was fined $20 and costs, and his revolver was confiscated.

At a meeting of the mine managers at Silverton on August 29, 36 mining companies were represented, and an association was formed, known as the San Juan District Mine Owners' Association. L. L. Haines, of the Iowa mine, was elected secretary and treasurer, and the following executive committee was chosen: San Miguel county—John Herron (Tomboy mine) and Bulkeley Wells (Smuggler-Union mine). Ouray county—W. J. Cox (Camp Bird mine) and George H. Hurlburt (Bachelor mine). San Juan county—W. Z. Kinney (Gold King mine) and John Terry (Sunnyside mine).

At Telluride, San Miguel county, the local Mine Owners' Association refused to consider the demands of the Mill Men's Union for an 8-hour day and the union mill men around Telluride quit work on September 1, indirectly affecting 1,000 miners. The Smuggler mill continued running, but with a curtailed force, manager Wells being personally in charge. On September 4 the cooks and waiters at the various mines were ordered out by the union, whereupon the miners walked out as individuals, not as a union, claiming they had no place to board. The managers of the mines around Telluride have not discharged any one, but have kept the agreement made last year, which expires in November, 1904.

The opinion is widely held at Telluride that should a long shut-down be forced the mine and mill employees will never obtain another agreement as favorable as the present one, which has been violated by the strike, and that wages will never be so high in the district as they were previous to this strike. Considerable numbers of miners are already leaving Telluride. The men in the Ophir district have not struck and the mines are running as usual. Present indications are that the miners and millmen around Silverton and Ouray will not strike.

San Francisco. Sept. 2.

(From Our Special Correspondent.)

The daily papers of San Francisco and others which should be better informed have announced the closing of the Utica mine at Angels, Calaveras county, but the property, the largest gold producer in the State for many years, continues busy as usual. Work has stopped through the south shaft, but continues through two other shafts, the Cross and Stickle. The south shaft, 1,100 ft. deep, has been in bad condition a long time owing to an enterprising official who, trying to make a record for large production years ago, worked too much ground close to the shaft. As the town of Angels is over this part of the mine heavy timbering had to be used and no caving could be allowed. The company is opening the Mattison mine which belongs to it.

At Randsburg, Kern county, the strike condition is quiet, notwithstanding the importation of non-union miners from Missouri. It is now proposed to make the entire camp non-union. As it takes about 300 miners to work the various properties, aside from laborers, teamsters, mill men, surface laborers, etc., the Desert Mine Operators' Association has quite a job on its hands to carry out this project. The pay rate is to be $3 per 9-hour day for miners and $2.50 for muckers, the same as before the strike, two months ago.

It is stated that the owners of the Yellow Aster declare they will not again employ union miners, but will rather shut down indefinitely. The non-union men are now at the Yellow Aster. So far the sheriff has had nothing to do, and the town is quiet.

Another Government agent has been visiting the vicinity of the Mountain Copper Company's smelters, the fourth or fifth who has been there. Why these repeated examinations after repeated reports by special agents the company fails to understand. It has reported that there is no timber near by to be damaged by furnace fumes and outside of the timber the Government has no interest in the question.

The Calaveras Miners' Union has boycotted the Calaveras *Prospect*, a paper published at Angels, because it took the side of the mine owners instead of the miners.

It may be stated that labor is quite scarce in the mining districts. Skilled miners are by no means as numerous as formerly and even unskilled men are not always to be had at a moment's notice. At the largest mine in Lassen county, where some 5,000 cords of wood are needed for winter supply, the manager has advertised, visited employment agencies and used other endeavors to get men. Having failed and needing the wood he has decided to contract with a gang of Chinese to cut the wood at $1.50 per cord, the same wages

as paid whites. Doubtless as soon as the Chinese reach Hayden Hill there will be a great outcry against the employment of Chinese labor.

The Chonchilula Mining Company, operating the Miner's Dream claim, near Harrison's gulch, Trinity county, has been advertising extensively, and promising 12 per cent returns, while the Corporate Agent Company, an allied corporation, agrees to purchase all dividend rights for a year and pay 90 per cent of the face. The company bought a mill in Denver and shipped it to the mine, but the plant was stopped at Redding by an attachment for $696 and costs. The attachment may result in an investigation of the company's standing.

Up in Butte county there is a plan on foot to run a big tunnel to drain the ridge between Big and Little Butte Creeks so that the channels may be cheaply worked. The famous Perschbacker or Magalia gravel mine is on this ridge, but the great flow of water has always retarded operations. The channels are all lava-capped and have to be worked by drifting.

There seems to have developed among the members of the Anti-Debris Association a strong feeling against permitting the men who have bonded the old Blue Point mine at Smartsville, Yuba county, to work off even the top ground by hydraulic pressure. If that is the case the bond will doubtless be dropped and the whole project given up.

At the Culyer-Baer and Eureka quicksilver mines, in Sonoma county, where a certain modern furnace had been put up, it is being torn down and reconstructed as a Livermore furnace—a type used in California for many years. At the Cloverdale mine in the same county the Livermore furnace has done such good work for a year or two that the managers of the other mines named have given up their modern type. A change of this sort seldom occurs.

The proposed cut at Daguerre Point, Yuba county, the site of the Government and State debris dams, will be made after all, notwithstanding the first objections of the State Debris Commissioner, who claimed that the cut would allow debris from the hydraulic mines to pass into the Sacramento and Feather rivers. The cut is to cost $158,000.

Several of the counties of the State are preparing special exhibits of ores and minerals to be sent to the St. Louis exhibition. Afterwards they will be brought back and put on view as permanent exhibits of the mineral resources of the respective counties.

The supervisors of Alameda county are talking of building the proposed road to some magnesite mines so the outlet shall be at Livermore, instead of at a point in Stanislaus. The mines in question are at the corner of Alameda, Stanislaus and Santa Clara counties and the county which puts up most money for a decent road will doubtless get the trade for its towns. Eureka, Humboldt county, is also talking of building a road to certain Trinity county mining districts. This rivalry among the towns and counties is not only of benefit to the mines, but to the towns themselves. Good roads would make a number of small places the supply depots for mining camps.

Around North Bloomfield, Nevada county, and Smartsville, Yuba county, many changes have taken place of late years in mining methods. At North Bloomfield the famous hydraulic mine of that name has its output restricted by impounding its debris. At the old Union Blue Gravel mine a 20-stamp double discharge mill has been put up to crush the cement gravel taken out by drifting. The company thinks it has gravel enough in sight to keep the mill busy for 20 years. A 5,000-ft. tunnel was run to reach the gravel channel. In the adjoining claim, the Derbec, several millions of dollars were taken from similar gravel.

Up in Nevada county a number of properties heretofore only prospected are being developed and other properties long abandoned are being reopened. Some old mines supposed to be worked out are making a good showing, and numerous deals are reported. There are a number of mines lying idle that people are trying to get control of, and the general outlook is very bright.

Victoria, B. C. Sept. 1.

(From Our Special Correspondent.)

Locally it is felt that the distribution of a dividend at this juncture by the Le Roi Company may be ill-advised, the mine having suffered in the past from lack of working capital. Until, however, the facts in respect to the present condition of the mine are published, it is impossible to arrive at definite conclusions, although there can be no doubt that the mine is generally in a better position than a year ago.

The report of the Le Roi No. 2 for the month of June refers to the shipping of 1,861 tons, the gross value of which exceeds $17 per ton, on which the mine obtained a return from the smelter of $9.87 per ton. As the report makes no mention of the costs, the net profit does not appear. Work done by the diamond drill has apparently been disappointing, but in the No. 1 mine on the 300-ft. level some rich ore has been found, assays of which vary from 11 oz. to 1.2 oz. gold per ton. The development work done does not appear to have been attended by satisfactory results up to the present. The Iron Mask mine will shortly pass into the possession of D. C. Corbin and other Spokane men, who held a mortgage on the property, and have started foreclosure proceedings.

In the east drift on the 400-ft. level at the Ymir mine, rich galena and zinc-blende ore is reported to run over $100 per ton. At present the ore appears as a pocket about 5 ft. wide on the hanging wall of the drift. The ore is being sacked up and shipped straight to the smelter. The Tamarac mine has been re-opened and a winze is sinking from the adit tunnel on the main vein. In the Atlin mine the lessee reports a vein 8 ft. wide, giving average assay returns of $70 at a depth of 45 ft. Already there is talk of litigation over Poplar creek claims, the ownership of the Lucky Jack being in dispute. It is claimed the original locator of the ground failed to record the assessment, thereby forfeiting his title, but it is asserted that the contestants planted their stakes while the locator had still two days in which to make his assessment record. A third party, named Rutherford, taking advantage of the dispute, has staked the ground over again.

There seems to be some doubt whether the St. Eugene mine, at Moyie, will resume work at present. The Trail smelter is being enlarged by the addition of two other lead stacks, and it hardly seems likely that the St. Eugene, which is certainly in a position to earn profits at present lead prices with the bounty added, will be allowed to remain idle for long. Four claims in the Crow's Nest area were sold last week to the Canadian Pacific Railway for $111,000. The railway proposes to develop the properties with a view to supplying its own fuel.

San Luis Potosi. Sept. 1.

(From Our Special Correspondent.)

Reports of fabulously rich gold strikes come from Xaquia, about 12 miles from Ejutla, in Oaxaca. The ledge is said to have been uncovered by a Mexican while plowing. The discovery is said to show a 12-ft. vein full of nugget and wire gold. A regular stampede had set in by the end of the week, and all the unemployed of Taviche are flocking to the new fields. The Taviche district as already developed covers an area of about 6 miles by 15 miles. The leading properties are the San Carlos, owned by Texans, the Rosario, Consuelo and San Juan, owned in New York, the Conejo Colorado and Zapote, owned in St. Louis, and the Escuadra, owned by the Guggenheim Exploration Company. In the Oaxaca district a new Deleware company capitalized at $100,000 gold, has started work on some gold property; the Oaxaca Mining and Milling Company is opening some good ores. At San Jose de Garcia, the Mexican-American Gold Mining and Milling Company, of Waco, Texas, is building a 10-stamp mill. Northeast of Oaxaca, about 40 miles, rich iron strikes are being made in the Sierra Juarez.

In Michoacan, in the district of El Oro, the new companies formed are the Rhenania, capital $400,000 Mexican, with 100 pertinencias in El Oro, and the Saturn Mining Company, also capitalized $400,000 Mexican, having 101 pertinencias in Tlalpujahua, Pedro Requeña y Abrew is president of both, Max Dorenberg being manager of the Rhenania and Paul Bergner manager of the Saturn. The Mexican Light and Power Company, known as the Canadian Company, is trying to get its wires in from the power plant at Tecaxa, Puebla, to El Oro and Tlalpujahua ahead of the Guanajuato Electric Light and Power Company. The Compania Explotadora de Minas de Carbon, with Carlos Stoffel, superintendent, and Arthur Pallandt, manager, will begin at Agostitlan, Michoacan, prospecting for coal. Adolfo Celada has applied for a concession for a railroad from Agostillanto to a point on the National Railroad; the line, being all in Michoacan, is promised state help. The San Ignacio Mining and Exploration Company, with A. J. Rawlings as president, is a new American company that will begin work on old properties on the Anotitlan vein of Zacualpam, Mexico.

From the camp of Guanajuato, state of Guanajuato, it is learned that the drainage tunnel of La Luz, which will unwater many old bonanzas on the mother vein, is started. The cost is estimated at over $2,000,000 Mexican, the time required several years. The Carmen-Guanajuato Gold Mining Company, with F. G. Corning, New York, president, and M. E. MacDonald, Guanajuato, manager, has retimbered practically all the old tunnels and drifts, and is reported making a profit of $15,000 Mexican a month, besides leaving large bodies of low grade ore in reserve.

In San Luis Potosi, at the smelter of the Compania Metallúrgica Mexicana, no disturbances of any kind have occurred during the several weeks since the strike. The company is preparing itself to meet whatever trouble may arise. Rains have checked work considerably on the Potosi & Rio Verde Railroad of the Compania Metallúrgica Mexicana, but its branch to San Pedro is finished, enabling the Victoria y Anexas Company to increase its shipments to the San Luis Potosi smelters. The Begonia, leased from the Victoria Company by the Compania Metallurgica Mexicana, is opening some nice ore bodies and is shipping 50 tons a day to the smelter. The Barreno, also of the Cerro de San Pedro, is shipping 60 tons a day. The greater part of all these shipments is a low grade silver and gold iron oxide. Francisco Escharzier is cyaniding the old dumps of San Pedro, which property (now known as La Victoria y Anexas) has been worked for centuries. Roberto Ipina is building a cyanide plant on the line of the Potosi & Rio Verde Railroad, also for the purpose of handling the old dumps.

Contrary to newspaper reports, Pedro Alvarado, the mining millionaire, is still alive. The output from his Palmillo mines at Parral, Chihuahua, is said by some to be as high as $100,000 Mexican a day. Adjoining Alvarado's property is the Capusaya, which Senator J. P. Jones and associate have just bonded at $2,500,000 Mexican. On the Guaynopa river of Guerrero district, Chihuahua, the Guaynopa Smelting and Reduction Company, of New York, capital $1,000,000 gold, is erecting a stack for smelting its ores and for custom work, and is figuring on a power plant on the river.

In El Oro and Tlalpujahua, of the States of Mexico and Michoacan, the new companies are the San Francisco, an American company, which had been working at Tlalpujahua some time, and has ordered machinery; El Perseo, with capital of $360,000 Mexican, on 42 pertinencias in Tlalpujahua, is already down 20 meters; the National Mining Company, with capital of $400,000 Mexican, to work old ground adjoining the Luz de Borda; the Presa Nueva of El Oro, and the Diamond Drill Exploration Company, with a capital of $360,000 Mexican and 200 pertinencias in El Oro. Of the other companies in Tlalpujahua, the Reliance people have decided to mine ore and thus pay for development work. The Luz de Borda is installing new hoist, pumping and boiler plants and is planning an aerial gravity train. Instead of El Oro Mining and Refining Company building to Tlalpujahua the Dos Estrellas Company will build to connect with the railroad at El Oro. In El Oro the Chihuahua y Anexas, Descubridora, Maria Taresa and Aurora are pushing work, and the latter, which has ground around the south and east of the El Oro holdings, is installing its hoisting plant. The Sullivan Company will resume sinking as soon as the gallows frame is erected.

Exchange on New York continues on its downward course, selling Saturday at 216. The mines of El Oro district continue to keep the market alive, Aldebaran bringing $170; Bessie, $25; Dos Estrellas, $3,525; Colon, $42; Old Abe, $65; Nache Buena, $60; Luz de Borda, $175; La Union, $160; Progreso, $45; Chihuahua, $58; Reliance, $25; of other camps Augustias brought $120; Providencia, $125; Barreno, $40; La Paz, Matchuala, $740; Santa Gertrudis, $91; San Rafael, $1,480.

Perth, W. A. July 20.

(From Our Special Correspondent.)

Crushing on the Barton lease for June was 183 tons for 500 oz. gold. Many valuable properties on these fields badly need easier communication with the coast. The country is rich in copper and tin, besides gold.

Coolgardie.—Bayley's mine has temporarily shut down pending reconstruction of the company and to provide fresh capital. It is expected that operations will shortly be started on a large scale.

Kalgoorlie.—The June returns place the Great Boulder Perseverance ahead of the Golden Horseshoe, which for some time held first place. The leading returns are: Great Boulder Perseverance, 11,000 tons, 17,631 oz.; Golden Horsehoe, 12,548 tons, 17,587 oz.; Great Boulder Proprietary, 9,100 tons, 14,334 oz.; Ivanhoe Corporation, 12,388 tons, 10,542 (fine) oz.; Oroya-Brownshill, 3,944 tons, 8,041 (fine) oz.; Associated, 3,789 tons, 6,156 oz.; Associated Northern, 822 tons 4,956 oz.; Lake View Consols, 7,418 tons, 4,905 (fine) oz.; Kalgurli, 3,815 tons, 3,625 oz. The continued good developments in Great Boulder Proprietary ground have had an effect on the share market. The mine has produced 853,297 oz. of gold, and the ore reserves in sight down to present lowest working (1,700 ft. vertical) may be estimated to contain an equal amount. The rich ore at the 1,000-ft. level, supposed to be the Horseshoe-Boulder-Boundary lode, has been followed over 100 ft. south, and in width and value has proved equal to estimates. Developments at other points are also satisfactory.

In the Lake View Consols, Perseverance lode, at the 1,000 ft. level, values continue high grade. In No. 11 level, on the main lode, the payable ore is over 40 ft. wide, averaging 10 dwt. per ton, exclusive of 4 ft. which assays from 1 oz. to 3 oz. per ton. On No. 12 level values continue over 1 oz. per ton for full width of the drive. There is no doubt this mine could greatly increase its output, but the manage-

ment is desirous of acting cautiously, gradually increasing output as fresh reserves are opened. The ore reserves are now estimated thus: Above the 1,100 ft. level, measured on three or more sides, 54,550 tons, assaying 15 dwt. per ton; measured on two sides, 70,250 tons, assaying 14 dwt. per ton. New discoveries are not included, owing to incomplete development.

The Hainault cyanide plant is mining at its mill capacity, and all the sands from the battery will be treated. Developments underground continue very satisfactory. Large bodies of payable ore have been opened at the 640-ft. level. Good grade ore is obtained from full width of the stope at the southern end, and the rise going up the western side of the lode, above the fourth level, is in good free milling ore.

The Kalgurli has found on the 1,050-ft. level some good ore, on the western side, 10 ft. wide; and at the 850-ft. level ore valued at 25 dwt., 16 ft. wide is obtained. Good grade ore is mined above this level, varying from 12 ft. to 18 ft. in width.

The Associated Northern, I understand, in view of the depletion of the rich ore which was supposed to be of much greater extent, has commissioned Mr. William Griffith to examine the mine again.

The following are the total yields from some of the principal Kalgoorlie mines up to June 30:

Great Boulder Proprietary	445,770	tons	for	853,297 oz.
Lake View Consols	440,896	"	"	798,692 "
Golden Horseshoe	424,099	"	"	749,971 "
Great Boulder Perseverance	408,660	"	"	570,183 "
Ivanhoe Gold Corporation	477,772	"	"	549,452 "
Brown Hill	172,363	"	"	345,801 "
Oroya-Brownhill	43,670	"	"	90,128 "
Boulder Main Reef	97,728	"	"	112,784 "
Kalgurli	70,384	"	"	89,310 "
Associated	268,928	"	"	402,125 "

GENERAL MINING NEWS.

During August 1,669 oil wells were drilled in the Pennsylvania and Trenton rock fields, giving 17,322 bbls. new production, says the Oil City *Derrick*. Pennsylvania completed 846 wells, 216 dry, with a production of 6,994 bbls. Ohio completed 436 wells, 35 dry, with a production of 5,364 bbls. Indiana completed 387 wells, 50 dry, with a production of 4,964 bbls. There were 584 rigs and 1,521 wells drilling on August 31.

ALASKA.

The season has been short at Nome this year and numbers of miners are returning. They do not usually come out before the end of September. Thousands of men have been disappointed at the results of this season's work.

Some of the miners who made the 500-mile journey through the Copper river valley to the upper Tanana valley, to go to the Nazina diggings, have come to grief through shortage of food.

ARIZONA.

COCHISE COUNTY.

Copper Queen Mining Company.—Heavy hoisting machinery and a compressor plant are to be installed.

Calumet & Arizona.—The output for August is given as 2,798,000 lb. of blister copper, which compares with 2,170,000 lb. in July.

MOHAVE COUNTY.

Leland.—The Colorado Iron Works has completed the 120-ton mill and turned it over to the mining company, which has put 30 men at work taking out ore.

SANTA CRUZ COUNTY.

(From Our Special Correspondent.)

Gold Zone Mining Company.—This new organization has been formed to take over and work the claims until recently owned by Mr. MacDonald. The ore from the Golden Eagle claim is now milled at the mill of the Montana Company, some two miles east of the mine, being packed over by animals. The milling is to determine values and the best form of mill and process. So far the indications are that a partial extraction on the plates with treatment of the tailings by cyanide will give the best results. About 40 men are employed and from 10 to 20 tons a day are put through. The ore is a rusty red mixture of rock, quartz and hematite, the result of the decomposition of iron pyrites. This is extracted in open quarry and the harder rock masses are rejected for the present, though it is expected that all the rock blasted out will pay in a mill to be erected just below the quarry, if the tests justify such a mill. The water question, it is expected, will be solved by the construction of a dam across the arroyo like that built by the late Judge George Chegney at the Montana mine. At the other claim, known as the Rob Roy, the occurrence of the ore is similar, but the crystals of pyrites are much larger. H. W. Squiers is general manager of these properties.

YAVAPAI COUNTY.

Ideal Mining Company.—This property in the Groom creek district, near Prescott, is to add a stamp mill and concentrator. E. L. Sharpneck is superintendent.

Nevada and Montauk.—These two groups in the Groom creek district have been taken over by the Pacific Gold Company, recently organized by Prescott and eastern men.

CALIFORNIA.

AMADOR COUNTY.

Shenandoah.—At this mine, at Plymouth, Samuel K. Thornton, superintendent, a 40-stamp mill is to be built.

BUTTE COUNTY.

Drainage Tunnel.—A project is on foot to run a big tunnel to drain the ridge between Big and Little Butte creeks, on which is situated the Magalia and other rich drift mines.

Miller.—R. S. Haskell, superintendent of this mine, near Forbestown, hopes shortly to have the property in operation again.

CALAVERAS COUNTY.

The Mokelumne Hill and Campo Seco Company's water supply has fallen short, and as a result several mines in that vicinity have suspended work.

Esperanza.—This mine at Mokelumne hill is expected to start again shortly.

Lava Bed.—Don M. Palmer has taken hold of this mine at Railroad Flat and will soon develop it.

San Domingo.—The old channels on the San Domingo at Dogtown, not far from Angels, are being opened up. The Purinton Mining Company has just completed a 1,200-ft. tunnel, which has opened up a good channel. Some three or four other mines are opening old ground.

EL DORADO COUNTY.

Ancient Channel Mining Company.—This company at Latrobe is buying machinery for the property and developing it.

Whim.—From this mine, near Fairplay, G. S. Estey has lately been taking some very rich rock.

HUMBOLDT COUNTY.

J. J. Macdonald, F. Maguire and others have located 4,000 in. of water in Red Cap creek to be conveyed by ditch and flume to the mines at Main Bar, where Red Cap creek empties into the Klamath river.

KERN COUNTY.

Dooley Bros. & Freese are opening an iron mine in San Emedio district, and now have their tunnel in 125 ft. This deposit is the largest in the district.

Alameda Gold Mining Company.—This company at Randsburg has recently had a crushing of 38 tons of ore, which milled $33 per ton.

Franklin.—In this mine on Indian creek rich rock has been struck by C. Ramey, A. Beatty and H. Williams.

Randsburg District.—There were 300 miners at work in this camp in June, and now about 35. Trains run three times a week instead of every day as formerly.

MARIPOSA COUNTY.

Golden Crown.—This mine at Darrah, owned by John Smither and H. Kane, is being examined by Los Angeles men with a view to purchasing.

McKinley.—Robert Wellman has begun work on this property at Hornitos.

Mount Gaines.—The mill of this mine at Hornitos has burned down, and the machinery is badly damaged. The mine had been idle some time.

Princeton.—At this mine, owned by the Mariposa Mining and Commercial Company at Mount Bullion, Charles C. Derby, manager, the hoist is out of order and some men had to be temporarily laid off.

MONTEREY COUNTY.

Manchester.—The Gonzales Mining Company has made a strike in this mine near Jolon.

NEVADA COUNTY.

Alta California.—Work on this gravel claim, recently purchased by Root & Heisner, has been resumed, after being suspended several weeks, because of the Grass Valley Consolidated being in financial straits. New arrangements have been made.

Austomah.—At this mine, near Grass Valley, good ore shows in the breasts of the fifth and seventh levels.

Crystal Lake.—This mine at Meadow lake is closed down pending the erection of new hoisting works. A good body of ore was recently opened.

Home.—At this mine, near Nevada City, it is expected that 30 stamps will shortly be added to the 30 already working.

Jenny Lind Mining Company.—This mine in Grass Valley district, Charles Stocks, superintendent, has struck the vein. The distance from the mouth of the tunnel to where the ledge was struck is over 1,100 ft. All expenses have been paid by assessments.

Lecompton.—The new pump is the largest in Nevada City district, and is capable of handling water to a depth of 3,000 ft. A new sand plant is nearly completed. The new 10-stamp mill is running.

Mountain Maid.—This mine at You Bet will soon resume work, Dr. Charles A. Puscheck, the owner, having returned from the east.

Murchie Consolidated Mining Company.—The directors have decided to put a 20-stamp mill on the mine at Nevada City before winter. Good ore is extracted.

Omega.—The old shaft of this mine near Nevada City is being cleaned out by G. Kartschoka & Company. The mine is owned by E. W. Gagan and L. B. Johnston, and adjoins the Neversweat.

Posey.—At this mine, Grass Valley, William H. Bray, manager, the new 10-stamp mill has started.

Union Blue Gravel.—In this mine near North Bloomfield 50 men are at work, and experienced miners are needed.

PLACER COUNTY.

Curtis & Carmichael, Benjamin Welch and other Sacramento men have secured rights to three miles of the American river, between Colfax and Iowa hill, and are planning to flume the river in order to reach bed rock. The work is in charge of William Grant, of Rough and Ready, who has 10 men employed.

SAN BERNARDINO COUNTY.

Gold Park.—At this district, a few miles south of Twenty-nine Palms, a stamp mill and cyanide plant will be put up.

Sacramento Wash.—In this region, not far from Needles, gold nuggets have been found a short distance from the ground of the Kleinfelter Company. The latter company found gold while sinking a well some months since.

SAN DIEGO COUNTY.

The Tourmaline deposits, near Mesa Grande, are producing about 350 carats of finished gems monthly. The rough crystals are ground at San Diego.

Encinitas Copper Mining Company.—This company will shortly work the copper deposits at Encinitas, near Oceanside. A road from the mines to the railroad is nearing completion.

Helvetia.—A 2-compartment shaft is being sunk on this mine at Julian, with seven men at work.

High Peak.—At this mine, near Julian, owned by the Julian Consolidated Mining Company, W. W. Boswell, superintendent, good free milling ore has been uncovered on the 350-ft. level.

SAN LUIS OBISPO COUNTY.

Klau.—This quicksilver mine, 15 miles from Paso Robles, is equipped with a 60-ton Scott furnace, and other appliances, and is now a regular producer. The mine was lately reopened after a long period of idleness.

Red Hill.—The mill at this mine, four miles from San Luis Obispo, has been shut down temporarily, awaiting the development of a larger water supply. Water will be pumped and piped from the creek.

SHASTA COUNTY.

Mountain Copper Company.—Furnace No. 3 of this company at Keswick, Lewis T. Wright, manager, has blown in, giving employment to 120 more men.

Balaklala.—At this camp 75 men are employed. It is reported that the smelter of the Balaklala Mining Company will be put up on Squaw creek, below Kennet. A survey for a railroad to connect mines and smelter has been made. Diamond drills are used to explore the ore bodies in the mine.

Eureka Tellurium Mining Company.—This company proposes to work again its mine, at Middle creek, near Redding. The mine has been considerably developed.

Marina Marsicana Mining Company.—This company, of which L. F. Barlow is superintendent, has 20 men at work at its Sunny hill property.

Mountain Lion.—H. O. Cummins and other South Dakota men have a bond on this mine near Shasta, and have let a contract for a tunnel.

Quartz Hill.—This mine, near Redding, owned by the Original Quartz Hill Mining Company, M. Maryauski, manager, will shortly start again, after a long idleness. Extensive development work is to be done. Unless the ore can be satisfactorily handled at the Keswick smelters a modern milling plant will be erected.

Uncle Sam.—This mine at Kennet, owned by F. H. Dakin, but formerly the property of the Sierra Buttes Mining Company, is being examined by San Francisco men.

TRINITY COUNTY.

California Surety Gold Mining Company.—This company owns the California, Pacific and Atlantic claims near Carville, and has done considerable tunneling this year.

Dorleska.—Five stamps are being added to the mill of this mine at Dorleska, J. H. McIlwaine, superintendent. The mine is owned by the Union Consolidated Mining Company of Los Angeles.

Mountain Boomer.—A Huntington mill has been bought for this mine at New river, William Montgomery, superintendent.

Nash.—At this mine, Dorleska, owned by the Trinity Gold Placer Company, William Maitland, manager, the cement is very hard and drifting is taking the place of hydraulic mining.

Coffee Creek District.—M. Rose, who has been working at his mine for two years, has uncovered a ledge of galena ore.

Ralston Group.—Development work continues on this group at Dedrick, George L. Bailey, owner, and some good ore is being taken out.

Strode.—This mine, near Carville, owned by J. S. & C. C. Strode, has eight tunnels, the lower one tapping the ledge at a depth of 960 ft. A 5-stamp mill is on the property, and 10 men are employed.

TULARE COUNTY.

Rice.—James and L. C. Rice, of Fannesville, have found a quartz ledge on Soda creek, 10 miles south of Mineral King and 60 miles east of Visalia.

TUOLUMNE COUNTY.

Willictta.—At this mine, near Chinese Camp, George Stayton, superintendent, while the men were driving a crosscut from an old tunnel they cut the east lode, showing high values.

YUBA COUNTY.

Penn Valley.—The tract of land bonded by Palmer & Blowers for dredging has been given up, after a number of drill holes were sunk.

COLORADO.

BOULDER COUNTY.

Melvina.—A 3,700-ft. tunnel is to be driven to tap the shaft of this mine at 735 ft. The ore is of low grade and a large cyanide mill is to be built. C. L. Dignowity, of Philadelphia, is in charge.

GILPIN COUNTY.

(*From Our Special Correspondent.*)

Gilpin Ore Shipments.—The August shipments of smelting and crude ores and concentrates from the Black Hawk depot to the Denver smelters and to the Idaho Springs mills were 256 cars or 5,120 tons. Now that the Golden smelter is accepting custom ores, shipments will show a large increase.

Blue Grass Mining Company.—Iowa men interested in a large group of claims in Phoenix district have decided to erect a mill, and it is expected a contract will be let to McFarlane & Company, of Central City and Black Hawk. R. L. Alexander, Rollinsville, is superintendent, and R. L. Parrish, Leon, Ia., is president and manager.

Cashier Gold Mining and Reduction Company.—This company has declared its fourth dividend of 1-3c. per share. Returns from a lot of first-class ores sent out by Jordan & Company brought values of 14.4 oz. gold, 19.3 oz. silver and 11.9 per cent copper or $305 to the ton. Between 40 and 50 men are at work on a leasing system, and the entire product goes to the local sampling works. B. L. Campbell, Central City, is in charge.

Eagle Mill.—Negotiations are under way for the purchase of this mill at Black Hawk, owned by Frank C. Came, of Denver; B. G. Granville, of Central City, and John L. Hoefler, of Denver, are the prospective purchasers. The mill is equipped with 35 rapid-drop stamps, and has been run on custom ores entirely. B. M. Nelson, Black Hawk, is in charge as foreman.

Elizabeth Mining Company.—This company is figuring on installing machinery at its Skelly mine in Illinois-Central district. The shaft is to be sunk deeper. W. Ballantyne, Central City, is in charge.

London Properties, Limited.—A shipment by leasers from the 100-ft. level of the Pierce mine brought values of between 16 and 17 oz. gold, or about $350 to the ton. Good headway is made in sinking and the shipments of milling ores are giving fair returns. London, England, parties are interested in a lease and bond proposition with E. M. Messiter, Central City, in charge.

Onoko Gold Mines Company.—This company is going to erect new shaft-buildings and install machinery good for a depth of 1,000 ft. The main shaft at present is down 220 ft. Some very nice smelting ores from the 120 west level are divided into first-class, carrying values between $65 and $75 per ton, and second class between $25 and $40. The company is making a 50-ton shipment to the local plant. W. L. Shull, Russell gulch, is superintendent of the property.

Penobscot Mining and Milling Company.—Valley Falls, Kan., men have a group of claims in Independent district. The main tunnel is in over 400 ft., with a very fair showing; the main shaft is down 200 ft. The company is figuring on its own milling plant in Gamble gulch. P. J. Hamble, Perigo, is manager.

Town Topics Gold Mining Company.—This company has let a contract for 100 ft. in its East Notaway shaft. Air drills are to be used in sinking. The usual force of nearly 50 men is at work under the tribute system, and regular shipments are made to the sampling works. Robert Miller, Central City, is the new superintendent.

Travis Gulch Mining and Milling Company.—New York men who are interested in a large group of claims in Travis gulch, in the northern section of the county, have resumed work, and the shaft will be sunk with three shifts. The company is figuring on a first-class plant of machinery. A. M. Willard, Gilpin, is manager.

GUNNISON COUNTY.

Akron.—Rich ore is reported in this tunnel in the White Pine camp. It runs 286 oz. in silver, with 43 per cent lead.

Tincup.—A rich strike is reported in this mine at Gold hill, near Pitkin. The shoot is thought to be the rich vein lost a few years ago and is said to be 3½ ft. wide.

LAKE COUNTY—LEADVILLE.

(*From Our Special Correspondent.*)

The advance in silver enables low-grade material, long unworked, to be handled, and has partly made up for the falling off of shipments due to the smelter situation. The zinc tonnage is about 7,000 tons a month.

Ballard.—But little is doing outside of prospecting work. The tying up by litigation of this territory has greatly interfered with successful development.

Banker Mining Company.—No work has been done since the death of manager Guth, but preparations are now under way for exploration with diamond drills.

Bon Air.—Two distinct leads or shoots showing high grade silver values are being followed.

Buckeye.—This property on Fryer hill is resuming after a long shutdown. There are some good iron bodies opened up above the water level which will be developed.

Bug Gold Company.—This Milwaukee company is exploring on virgin territory with the diamond drill. The company has located 20 additional claims upon which there is a good showing of manganese and iron. The company has begun to unwater the old workings and is to erect a mill.

Caribou.—Some repair work is under way and plans are being made to open up the ground to the east, where there is a 65-ft. iron body. Shipments resumed from the old workings at 100 tons daily.

Continental Chief Leasing Company.—A new tunnel is being driven below the old one and considerable siliceous ore is being taken out. Much new work is planned.

Crown Point.—This Sugar Loaf property, which has been idle for 20 years, has resumed under the direction of lessees. A good vein is being followed.

Diamond.—Shipments have increased to 100 tons daily from the lower levels, where a fair shipping grade of sulphides has been opened for a long distance.

Grayton.—This is a Poverty Flat property in the Leadville basin and the lessees have an immense manganese body opened up, but are prospecting for a richer ore shoot.

Ibex Mining Company.—The company is shipping about 8,000 tons a month of all classes of ore. The No. 4 shaft has been sunk to the Yak tunnel level, giving a depth of over 1,200 ft. The No. 1 shaft is also to be sent down deeper.

Iron Silver Mining Company.—Shipments are heavy, and new work is being done at both the old and new Moyer shafts. The ore shoot is continuous and of great strength, and mining men believe that it extends clear across the hill.

Little Louise.—San Francisco people are back of this enterprise, which comprises 22 claims in Little English gulch. The company intends erecting a mill.

London.—This property has resumed shipments. On the North London there are reported over 1,000 tons of ore that will average better than $100 to the ton. There are also large quantities of ore in the South London mine. The ore contains gold, silver, copper and lead and some of the best-grade sacked will run as high as 50 oz. gold.

Matchless.—Lessees are operating the old iron stopes and shipping a fair grade iron material.

Peerless Combination.—In addition to shipping to the Last Chance mill, the Peerless is opening up an some 300 tons a week of a good grade milling material extensive body of high grade lead ore.

Pilot Mining Company.—Plans are being made for resumption on this large acreage since litigation is ended. Several diamond drill holes are to be sunk to test the formation.

Reindeer Mining Company.—This is the new company on Rock hill sinking a deep shaft on the Wells Moyer ground, 400 ft. south of the old Sequin shaft. The new shaft goes down 500 ft. to start with. Sinking operations have begun under the direction of manager George Campion.

Statesman Group.—Litigation is keeping this property closed. There are good mineral indications and a good plant on the property.

Valley Mining Company.—Manager Henley is pushing two upraises, and recently encountered low-grade ore and some high-grade material.

Vega.—When the Diamond is opened the owners expect to conduct work on a large scale in this mine.

Wells & Moyer Placer.—The new shaft some distance from the Sequin is making good headway.

Yak Mining, Milling and Tunnel Company.—Three thousand tons a month of sulphide ores are shipped by the company in addition to 1,000 tons by lessees.

LAS ANIMAS COUNTY.

Rugby Coal Company.—The mines of this concern at Rugby, in the northern part of the Trinidad district, have shut down indefinitely, owing to the company refusing to accede to the demand of the 125 miners for shorter hours. The mines at Primrose, employing 128 men, have been closed for the same reason.

OURAY COUNTY.

Barstow Mining Company.—This company of Ironton will, it is said, build a 100-ton mill. J. Geisel is superintendent. Good ore is reported in the Bobtail mine in the Red mountain district, near Ouray.

SUMMIT COUNTY.

Providence-Colorado Mining and Milling Company.—A streak of heavy lead ore that carries good silver value is reported at a depth of about 150 ft. The shaft is apparently being sunk on the edge of the Gibson hill contact, near Breckenridge. Harry S. Whitehead is superintendent.

SAN JUAN COUNTY.

(*From Our Special Correspondent.*)

Dewey.—Shipments have been resumed from this claim in Horseshoe basin, after several years of idleness.

North Star.—A new machine shop is being erected and many other improvements are under way about this mine on Sultan mountain. The ore is now sorted into three classes—lead-silver, gold-copper and concentrating.

Sylvanite.—The machinery removed by former operators is being replaced at the shaft of this Silverton property, preparatory to a resumption of work.

Tantallon.—A very rich strike is reported on the 400-ft. crosscut of this claim, in Minnie gulch, near Silverton.

Yale-Brown Mines Company.—This company was recently organized to work 100 acres of mining property near Chattanooga, close to the Silver Ledge property.

TELLER COUNTY—CRIPPLE CREEK.

According to a press despatch, the Strong, Findlay and C. K. & N. mines resumed work on August 8, under the protection of the militia.

(*From Our Special Correspondent.*)

Strike Situation.—Several days ago a number of men were put to work on the Golden Cycle mine; one of them on his way to work was stopped with a gun but afterward permitted to go on. On the same day Mr. Hawkins, justice of the peace at Anaconda, was knocked down and badly beaten in the town of Altman, presumably because Mr. Hawkins had imposed light fines on two of the guards employed at the El Paso mine brought before him on the charge of carrying concealed weapons. On the same night one of the carpenters employed at the Golden Cycle was taken from his house, brutally beaten and shot through the back. Owing to these acts and to unquieting reports the Mine Owners' Association, the Citizens' Alliance and the mayors of Cripple Creek and Victor asked Governor Peabody for troops. The Mine Owners' Association has offered rewards for the arrest and conviction of the men that assaulted Mr. Hawkins and the carpenter on the Golden Cycle and the parties that set fire to the Eclipse shaft house. About 500 troops are at present in the district and more may be sent. The Sheriff of Teller county declared that he could handle the situation. The Governor, however, had a commission investigate the situation, which, after looking over the district, advised the immediate sending of the troops. Undoubtedly the

large majority of the striking miners are law-abiding citizens, but there are a number of lawless men in the district who will stop at nothing to gain their point. It is freely predicted that several more mines will open up immediately, as there are plenty of men ready to go to work if they are assured of protection. There is undoubtedly much dissatisfaction among the striking miners, the bulk of them having been opposed to the strike from the beginning. A citizens' alliance has been formed in this district, including the mine owners and most of the business men. The work of organizing this body was kept quiet for some time. The alliance will combat in a legal way the boycotting of business houses, etc., by the unions. The alliance also stands for the continuation of an 8-hour day for the miners and a daily wage of $3.

Acacia Gold Mining Company.—Messrs. Wyatt and Sharpe have a lease on the north 400 ft. of the Burns claim. The block was formerly worked by George Wrockloff, who made considerable money out of it, and of late by McFarland & Ownbey and the French Leasing Company, who were not so successful. The shaft is about 800 ft. deep.

Cripple Creek Enterprise Gold Mining Company.—The labor troubles have not affected this concern at all. Drifting is in progress under the streets and alleys of the city. Dan Hanley, of Cripple Creek, has charge.

Drainage Tunnel.—The tunnel has been completed. It connects with the 600-ft. level of the El Paso mine and is a little over 4,000 ft. long. It cost about $80,000. The completion of the tunnel means much to the district, for if the mines cannot work they will have a chance to drain while the labor troubles are being settled.

Eclipse.—The shaft house and hoisting plant have been destroyed by fire. Some suppose the fire to be of incendiary origin. The property of late has been worked by lessees only. The loss is partly covered by insurance.

Fluorine Mill.—This cyanide mill will soon be ready to treat the low grade oxidized ores of Copper mountain.

Vindicator Gold Mining Company.—It is reported that Adolph Zang, of Denver, has sold his interest in this company to Dennis Sheekdy, of Denver. The company recently issued a statement that a man need not join the union before he can get work. Heretofore this company has been a strong friend of the union. No work is being done in the mine at present; the pumps were recently pulled.

IDAHO.

ADA COUNTY.

Magnolia.—This group, on Miller Mountain, near Boise, is to have a 20-stamp mill. The Nampa Mining Company owns the property.

BLAINE COUNTY.

Cambridge Mining Company.—This company is to develop seven placer claims with a water right, at the head of Little Smoky and Smoky-Bullion creeks, near Hailey. The capital stock is $25,000; principal place of business, Hailey; H. A. Walter is president, C. R. Ruthrauff vice-president and secretary, Charles Hernsheim treasurer, and I. J. Wadley superintendent.

IDAHO COUNTY.

Fuller-Lawrence.—New York and Pittsburg men have purchased this group of 10 claims, near Roosevelt, adjoining the Dewey mines.

SHOSHONE COUNTY.

The electric power transmission line constructed by the Washington Water Power Company from Spokane, is completed and in use. The power is sold to the Bunker Hill & Sullivan Company, which has the contract for lighting the town. The following properties are to be supplied: At Kellogg, the Coeur d'Alene Development Company, owners of the Silver King and other mines, and the Last Chance; at Gem, the Hecla mill, Mammoth and Standard; at Burke, the Tiger-Poorman and Hecla mines. A total of 2,500 h. p. has been contracted for.

Golden Chest.—The deal with eastern men calling for a large payment on this mine has been declared off.

O. K.—Since the strike on the 400-ft. level it is reported that the stockholders are to arrange for a large mill. It is stated that $65,000 has been expended on the property already.

INDIANA.

(From Our Special Correspondent.)

The Indiana tax board has denied the appeals from Sullivan and Greene counties, and sustained the local tax boards in listing coal mining privileges for taxation. The coal mining companies in their appeal claimed that when the land was taxed the unmined coal was included. This view was not sustained by the State board.

This action has raised the query why taxes are not also collected from the gas, oil or stone quarries, or from mineral springs. The action of the board in taxing anew coal that is being mined seems revolutionary. Land known to contain coal is taxed at an increased rate because of its value, but never before has the State attempted to tax coal mining privileges separately. It is understood that the question will be tested in the courts.

CLAY COUNTY.

(From Our Special Correspondent.)

A suit has been filed in this county by the National Company in which the defendants, John E. Jordon, Peter and James Andrews, formerly with the Manufacturers and Merchants Coal Company and the Andrews Coal Company, and State Mine Inspector James Epperson, are charged with conspiracy to defraud. The suit grew out of a sale of the property of the Andrew Coal Company.

HENDRICKS COUNTY.

(From Our Special Correspondent.)

Land owners in the vicinity of Coatesville say they have discovered a good seam of coal.

SULLIVAN COUNTY.

(From Our Special Correspondent.)

George F. McCulloch, president of the Union Traction Company, has purchased 1,600 additional acres of coal land in this county northwest of Shelburn and west of the Terre Haute railroad.

MICHIGAN.

COPPER—HOUGHTON COUNTY.

(From Our Special Correspondent.)

Atlantic.—The August output of this mine was 295 tons of mineral. A temporary shaft house is being erected at shaft A to replace the structure recently burned.

Arcadian.—The greater part of the extensive plant once at this property has been sold to various mining companies. The steel rails of the tram roads and skipways have been removed and the shafts are filling with water.

Calumet & Hecla.—The new vertical exploratory shaft on the Kearsarge amygdaloid lode is down 20 ft. A small hoist has been installed, and an 8-in. pipe line laid to one of the compressors on the Calumet lode. A combination changing house and office, 16 by 40 ft., has been erected. An engine house of the same dimensions will be constructed. The shaft will be sunk 50 ft. in the ledge, and a crosscut run to the Kearsarge lode. Capt. William S. Trethewey, formerly of the Atlantic mine, is in charge of this work.

Champion.—This company has installed a New Century jig, manufactured by the American Concentrating Company of Joplin, Mo., in the stamp mill at Freda for experimental purposes. The August production was 791 tons of mineral.

Elm River.—Operations on this property are confined to No. 1 shaft, on the Winona amygdaloid lode. The management intends to continue sinking to 1,000 ft., at which depth crosscuts will be run to the lode.

Franklin.—This company produced 367 tons of mineral in August. Raising on the line of the shaft from the seventh and fourteenth levels south from No. 2 shaft has started.

Michigan Smelting Company.—Work on the new plant west of Houghton on Portage lake is progressing rapidly. Material is arriving in large quantities and the buildings will be erected before the snow flies.

Mohawk.—The output in August was 333 1-5 tons of mineral.

Phoenix Consolidated.—John R. Stanton, president of this company, has completed his inspection of the mine.

St. Mary's Mineral Land Company.—An amygdaloid lode has been cut by the diamond drill south of the Winona. Theh formation has not been identified as the Winona amygdaloid.

Tamarack-Osceola Copper Manufacturing Company.—The wire and sheet mills at Dollar bay are running full capacity. The company is controlled by stockholders in the Tamarack, Osceola and Isle Royale mines.

Winona.—The output in August was 60 tons of mineral. No. 3 shaft has reached the sixth level. It is in the richest shoot of copper opened so far, and was sunk in short time, sinking and raising from the various levels south from No. 2 shaft hastening the work.

Wolverine.—The product of this company in August was 517½ tons of mineral.

COPPER—KEWEENAW COUNTY.

(From Our Special Correspondent.)

Allouez.—Power drills are in commission in the new shaft sinking to open the Kearsarge amygdaloid lode. The ledge has been penetrated for 25 ft.

Cliff.—Exploratory work on this old property, idle for 25 years, has started. It was once a famous producer, yielding large masses of native copper and silver. Recent developments on adjoining land indicates that the property carries the outcrop of the Kearsarge amygdaloid lode. It will be systematically explored by trenches and test pits. The property is now under the Bigelow management.

COPPER—ONTONAGON COUNTY.

(From Our Special Correspondent.)

Adventure Consolidated.—Sinking in No. 1 shaft has been discontinued and is now confined to No. 3 shaft. About 20 power drills are in use. Roy Dunstant, of Hancock, has been appointed superintendent of the stamp mill at Edgemere, succeeding Henry Key, resigned.

Mass Consolidated.—The August product is estimated at 143½ tons of refined copper.

Victoria.—Sinking in No. 2 shaft is approaching the 20th level. The drifts at the lower levels are opening good ground. Work on the power canal is progressing steadily. The stamp mill location has been staked out and cleared.

IRON—GOGEBIC RANGE.

Metcor.—The Castle Mining Company, in which Oglebay, Norton & Company, of Cleveland, are large stockholders, has secured the lease of this mine east of Wakefield, recently surrendered by Corrigan, McKinney & Company, and will take possession of the property. A pump on the fourth level is holding the water in check at that point. G. H. Abeel, of Ironwood, will superintend operations.

Norrie.—The new shaft house is being erected at A shaft of this mine at Ironwood. It is a steel structure, being built by the American Bridge Company, one of the constituent companies of the United States Steel Corporation. It contains two skip compartments, each 6 by 6 ft., one cage way, same size, and a ladder, pipe and counterweight way 4 by 6. This shaft is about 900 ft. deep and is lined with steel sets and wood lath, except for the upper 20 ft. to ledge, which is timbered in the customary way.

IRON—MENOMINEE RANGE.

Beta.—Messrs. Van Dyke and Brown, who have an option on this mine, in the Iron river district, have placed an order for a 250 h. p. boiler, an 18 drill compressor and a hoisting plant. The mine is cleared of water and the timbering was found in excellent condition.

Gibson.—Water will be pumped out of this mine at Amasa and a crosscut driven where the water was struck. It has not been opened since 1897.

MINNESOTA.

IRON-MESABI RANGE.

(From Our Special Correspondent.)

T. 59, R. 14.—There is renewed activity in the easterly part of T 59, R 14, northeast from the Duluth & Iron Range road's crossing of the Mesabi. In section 12 the land of the Oneota Mining Company is under exploration by H. E. Smith, of Duluth. He has put a hole down 168 ft. and is in slate. In the northwest part of the same section others are starting to drill. In the southwest corner of section 15 explorations have ceased. In the southeast part of the same section no clean ore has in fact been found, and the outlook is not so good as it has been. In section 28 the Delta Iron Company has stopped work, after having been drilling for months in ore and hard taconite. Near Mesaba station drills are still working. Considerably to the northeast of other work mentioned, R. Whiteside has been doing a little test pitting on lands of the Mesabi Iron Company. It will surprise most mining men if any large ore body, other than those already discovered, is found in this district.

MISSOURI.

ST. FRANCOIS COUNTY.

(From Our Special Correspondent.)

Central.—The strike started by the machinists nearly a month ago at the Central mine, causing a walkout of the mining, milling and smelting departments, has ended in an ignominious defeat of the union. The men were urged by labor agitators to strike for shorter hours without any reduction in pay, but when the men found that the works would be closed down indefinitely, they gladly returned to work under the former conditions.

St. Joe Lead Company.—The improvements in the crushing department of the mill have been successfully completed, with the result of increasing the capacity nearly 50 per cent, after dispensing with 2-3 of the labor. The construction of the new No. 2 mill at Owl creek is being pushed. It will have a daily capacity of about 1,000 tons.

MONTANA.

LEWIS & CLARKE COUNTY..

Red Bird Mining Company.—The property of this concern, known as the Punches mines, 12 miles west of Helena, is reported producing rich copper ore. It

was originally operated as an iron proposition, the product being used as flux at the smelter.

MADISON COUNTY.

Clipper and Boss Tweed.—Work has been suspended on these mines, owned by the Indian Mining Company. All the ore was shipped to the Washoe smelter, in Anaconda, and the Colorado, in Butte. The reason for suspension is said to be inability to get the ore treated owing to the Washoe smelter being idle.

PARK COUNTY.

Dreibert.—This mill, 4 miles from Helena, has been put in operation on ore from its own mine.

Expert.—A 5-stamp mill is being put up on this mine, where an 8-ft. vein of gold ore is reported running from $50 to $100 gold per ton.

Klondyke.—A 5-stamp mill is on the way to this claim on Horseshoe mountain, near Gardiner.

Montana-Kimberly.—The Revenue 40-stamp mill is running steadily, treating about 180 tons of ore a day. Work at the cyanide plant has been shut down for a time. About 100 men are working in the mines.

SILVER BOW COUNTY.

Alice.—This mine is now operated by lessees; considerable repairs must be made before any ore can be taken out. The shafthouse, which was destroyed by fire, has been rebuilt, a new boiler and engine house taking the place of the one destroyed. The ore will be treated at local reduction works, as better rates have been obtained from the smelters.

Boston & Montana Company.—The trial of the suit of John Macginniss against this company was begun in the district court at Butte on September 1. The plaintiff is the vice-president of the Montana Ore Purchasing Company, and the suit is to prevent the Boston & Montana Company from turning over its business and affairs in Montana, to the possession and control of the Amalgamated Copper Company. It is alleged that more than 133,000 shares of the Boston & Montana Company have been unlawfully transferred to the Amalgamated. Macginniss began the suit as the owner of 100 shares of stock of the Boston & Montana Company.

NEVADA.

NYE COUNTY.

(From Our Special Correspondent.)

James E. Cain, controlling water rights in Mono county, Cal., has been in Tonopah investigating electrical requirements. He was accompanied by I. E. Thiberath, an electrical engineer, connected with the Bay Counties Power Company of California. The fall along the course of these creeks is so great that considerable power could be developed and transmitted to Tonopah, 120 miles distant. The district passed through would include Silver Peak and several of the important outlying camps.

McNamara.—The suit of the McNamara Company against the Tonopah Mining Company is set for hearing on November 3. The dispute is over the boundary line of the Buckboard claim of the Tonopah Company.

Montana-Tonopah Company.—Developments in the property of the Montana-Tonopah Mining Company are opening increasing values. Immense bodies of low-grade ore have been exposed, and shipments are regularly made from the high-grade ore bodies. Returns from the latest shipments are: First-class ore, 54,870 lb., valued at $8,147; second-class ore, 69,866 lb., valued at $4,802; total, 134,736 lb., valued at $12,949, gold being valued at $19.50 and silver at $0.558 per oz.

Montana Tonopah.—In the upraise from the 512-ft. level the ore is said to average $600 per ton, and is being sacked for shipment.

North Star Tunnel and Development Company.—At a depth of 1,035 ft. a north and south ledge was cut 7 ft. wide. It has since widened with no foot wall in sight. The ore is a white quartz heavily oxidized and is said to give average assay values of $29. The company owns five mineral claims and a tunnel site on the north side of Mount Oddie. The property adjoins that of the Montana on the east and the Belmont on the north. The shaft is equipped with a 50-h.p. gasoline engine and was sunk 960 ft. before it encountered quartz. The majority of the veins encountered in Mount Oddie strike east and west, but the North Star ledge runs north and south following the course of the San Antone mountains.

Ohio Tonopah Mining Company.—The management announces that in the east drift of the 770 ft. level, 80 ft. from the shaft, a quartz leader has widened into a defined body of ore over 1 ft. wide, assaying well in gold and silver. The shaft is 110 yds. southwest of the main shaft of the Tonopah Mining Company, and was sunk 740 ft. before encountering ore.

Salt Lake Company.—This company which recently received an adverse decision from Judge Hawley in the suit brought against it by the Tonopah Mining Company, has decided to appeal from his decision.

Tonopah Extension Company.—This company owning the Grand Trunk claim adjoining the western boundary lines of the Tonopah Mining Company property has passed through 14 ft. of quartz at a depth of 215 ft. The ledge has an east and west course and is comparatively low grade, the highest assay obtained being $50 per ton. A 54-h.p. steam hoist is being installed and sinking will continue to the 500-ft. level.

Tonopah Mining Company.—The arrival of John Brock, president, has given a definite movement to the improvements contemplated for several months. The company may construct a railway to Tonopah and incorporate a company made up of the Tonopah Mining Company, the Montana-Tonopah Mining Company, the Salt Lake, Gold Hill and other large interests. Ground will be broken on the road inside of 30 days, and a party of surveyors has left Tonopah, it is said, to make the final survey It is expected that February 1 will see the road into Tonopah.

The Tonopah Company has begun to develop water in various places near the town, the first site being at Stewart's Wells, about 12 miles away. The benefit from these plans cannot be overestimated.

Tonopah Gold Mountain.—In the property of this company at Gold Mountain a shaft has been sunk on the vein 25 ft., at which point the vein is 12 in. wide and the rich ore is 2 in. wide on the foot wall. The company contemplates erecting a mill on the ground.

NEW MEXICO.

GRANT COUNTY.

Aztec.—Arrangements are said to have been completed for a 60-ton concentrator for this group near Pinos Altos. The old Aztec mill will be moved and set up at the mines. Dallas, Tex., men are said to be behind the project.

SAN MIGUEL COUNTY.

Archibald and Pettis.—Machinery for a big copper reduction plant is about to be purchased for this property, near Mineral Hill.

San Miguel Copper Company.—F. J. Buck, consulting engineer, has gone to Denver to secure the machinery for a 150-ton leaching plant, which the company is to install on its property in the Tecolote district.

SANTA FE COUNTY.

Gold Bullion.—This company has acquired the milling plant of the Monte Cristo Mining Company and is to re-equip and operate it near Golden on placer properties.

NORTH CAROLINA.

CABARRUS COUNTY.

(From Our Special Correspondent.)

Phoenix.—At this old mine the present company is down some 500 ft. and still sinking. It has struck rich ore and is purchasing many adjoining properties to combine and work them by power generated at Rocky river, near the mines.

MECKLENBURG COUNTY.

(From Our Special Correspondent.)

Hercules Gold and Copper Mining Company.—This company, at present operating the old Emmons mine in Davidson county, has taken an option on the St. Catherine gold mine at Charlotte and is unwatering it.

OHIO.

JEFFERSON COUNTY.

Twelve hundred acres of land in the vicinity of Yellow creek, on the northern border of Jefferson county, are reported purchased by Cleveland operators. The property includes the old Diamond mine.

Upstill Coal Mining Company.—The properties of this company, containing about 3,000 acres, near Mount Pleasant, were sold to Morris & Poston, of Cleveland, August 12. The mines have a capacity of 2,000 tons a day and are in operation about a year.

OREGON.

BAKER COUNTY.

California.—This mine, L. R. Bellman, manager, is to be equipped with a cyanide plant.

Morning.—The owners of this property are reported as stating that it has practically been sold to eastern men. The mine is in the Greenhorn district and is said to be well equipped.

DOUGLAS COUNTY.

Benton.—A 40-stamp mill is to be erected at this mine near Glendale.

PENNSYLVANIA.

ANTHRACITE COAL.

Diamond.—An electric haulage system is being installed in this mine at Scranton, which will supplant the mine mule, now used in pulling the cars from the chambers and gangways to the foot of the shaft.

Philadelphia & Reading Coal and Iron Company.—This company, near Pottsville, has closed every one of its washeries, which produce small sizes. It is estimated that fully 2,000,000 tons of small sizes are now in stock.

Union Coal Company.—Notice was issued that all the collieries in the Shamokin region, employing 3,000 men, would be closed September 1 indefinitely.

BITUMINOUS COAL.

Pittsburg Coal Company.—Six hundred acres of coal land in Union township, Washington county, were purchased recently by this company, and deeds are being passed for a considerable acreage that has been optioned by agents of the company in Finley township, the whole aggregating close to 1,500 acres of new territory adjacent to the Wheeling division of the B. & O. R. R., and accessible to the "Wabash" extension. At the same time 10 acres of surface, for mine equipment and houses, were purchased at a cost of $265 per acre, the coal right price being $150 per acre.

SOUTH DAKOTA.

CUSTER COUNTY.

(From Our Special Correspondent.)

Saginaw Gold Mining Company.—At the annual meeting in Chicago officers and directors were elected. The company is undergoing reorganization.

Yerxa Group.—James Yerxa has sold these claims to eastern men who are organizing a company. There is a hoisting plant on the grounds.

LAWRENCE COUNTY.

(From Our Special Correspondent.)

Aurizone Mining Company.—The officers and directors are: H. R. Luther, Chicago, president; W. F. Hanley, Custer, treasurer; Dr. N. H. Conger, Hill City, secretary; A. T. Feay, Custer, vice-president. These with the following constitute the board of directors: C. Von Woehrmann, Hill City; W. F. Towner, Custer; J. B. Safford, Hill City; Robert Perli and Sheridan McBratney, Galena. The ground consists of 15 claims in Lost gulch, a tributary of Bear Butte creek in Bear Butte district. Developments consist of 815 ft. of tunnel, 100 ft. of shaft and 300 ft. of open cuts.

Deadwood-Standard Gold Mining Company.—The management asserts that the first dividend will be paid within 30 days from net earnings.

Dizzy Mining Company.—The shaft is down 100 ft. As soon as it strikes a solid formation a diamond drill will be used.

Dorr-Lundberg-Wilson Cyanide Plant.—The building is well under way and J. V. Dorr is in Chicago purchasing the last of the machinery. Crushing will be done by Chilean mills.

Gold Stake Mining Company.—Work has started in a tunnel under the direction of George W. Wilkins, superintendent.

Penobscot Mining Company.—One hundred and twenty-five tons of ore are treated daily at the cyanide mill and 50 tons are shipped to Denver smelters.

Reliance Gold Mining Company.—At the annual meeting in Deadwood recently officers were elected as follows: S. E. Olson, Minneapolis, president; F. W. Bower, Deadwood, vice-president; F. W. Medbery, Deadwood, secretary and general manager; E. E. Bennett, Lincoln, Neb., treasurer. Work has begun on the mill site for the 300-ton cyanide plant. James Hartgermy will build the mill, which will be at the main tunnel on the Annie claim.

Spearfish Gold Mining and Reduction Company.—The September dividend of 1c. a share on preferred stock has been declared, making nine dividends that the company has paid. The mill was recently closed several days, owing to flood damage.

Tinton Tin Company.—Machinery is arriving for this company at Tinton, in Bear gulch district. Twenty-five miners are at work on a tin-bearing vein.

PENNINGTON COUNTY.

(From Our Special Correspondent.)

Burlington Gold Mining Company.—The shaft is 40 ft. deep and the vein being followed has widened to 8 in.; 35,000 ft. of lumber are on the ground for surface improvements.

Empire State Gold Mining Company.—The Golden Slipper mine is being systematically developed. J. B. Safford, of Hill City, is manager. E. M. Dickinson, now general manager of the Stilwell route, recently visited the property.

National Smelter.—This plant, owned by the Horseshoe Mining Company, has started up after an idleness of one year, supplied with ore from the Ben Hur mine in Lawrence county.

TENNESSEE.

HAMILTON COUNTY.

Montlake Coal and Coke Company.—This company has under lease 1,200 acres of land in North Chickamauga gulch, 14 miles from Chattanooga, on Walden's ridge. By January 1 it is expected 200 tons per day will be mined. The officers are H. H. Buquo, president and general manager; G. W. Nixon, vice-president, and S. J. Buquo, secretary and treasurer.

KNOX COUNTY.

Holston Zinc Company.—The building for the 100-ton concentrator being put up by this company at a cost of $40,000, near Knoxville, is about completed and is expected to be in operation before September 15.

Commercial Mining and Milling Company.—The plant this company is building east of Knoxville is expected to be in operation about October 1 and have a daily capacity of 25 tons of barytes.

Valley Mount Lead Company.—The ore from this property south of Knoxville is reported showing up well and a concentrator is under consideration.

UTAH.

BEAVER COUNTY.

(*From Our Special Correspondent.*)

Newhouse Mining and Smelting Company.—The new pipe line from Wahwah Springs to the site of the proposed reduction works, near the Cactus mine, will be completed inside of 60 days.

IRON COUNTY.

(*From Our Special Correspondent.*)

Colorado Fuel and Iron Company.—This company, through its resident agent, O. M. Ladd, has closed up a deal for the iron lands formerly owned by the Taylor estate, comprising 150 acres. The property is considered as good as any in the iron regions of Utah. The price is said to be close to $100,000. With this land the Colorado concern now has iron lands embracing about 4,000 acres, and in addition a large tract of agricultural and coal lands, probably close to 6,000 acres. The early extension of the Rio Grande Railway into the new iron fields is expected. The ores will go to Pueblo.

JUAB COUNTY.

(*From Our Special Correspondent.*)

Tintic Ore Shipments.—The shipments for the week ending August 28 aggregated 129 car loads, as follows: Grand Central, 25; Carisa, 1; Black Jack, 6; Victor Consolidated, 6; Ajax, 2; Mammoth, 15; Lower Mammoth, 2; Eureka-Hill, 10; Centennial-Eureka, 13; Bullion-Beck, 11; Gemini, 6; Martha Washington, 1; Star Consolidated, 2; La Clede, 1; Dragon Iron, 25; May Day concentrates, 3.

Tetro.—Ore has been found in place at a point about the center of the Tetro claim and at a depth of 800 ft. The fissure is said to be 12 ft. wide and to assay 32 per cent lead, 20 oz. silver and $1.50 gold.

PIUTE COUNTY.

Sevier Consolidated Gold Mining, Milling and Prospecting Company.—The officers of this company are W. E. Maison, president; E. H. Thornton, vice-president; H. C. Lawrence, secretary and treasurer, and general manager. The offices are in Salt Lake City. The company has nearly completed a mill at Kimberly for treating its ores. In the mine tunnels have been driven which are respectively 500 ft., 600 ft., 900 ft., and 1,100 ft. long.

(*From Our Special Correspondent.*)

Annie Laurie.—The mine and mill have resumed work after a brief shut down, due to an attempt to unionize the camp. Needed repairs were made to the mill. The company does not refuse to employ union miners, but does refuse to recognize unionism.

SALT LAKE COUNTY.

(*From Our Special Correspondent.*)

Bingham Consolidated.—The copper bullion shipments during the week ending August 28 amounted to three cars, 180,000 lbs.

Great Divide Mines Company.—This company is capitalized at $2,000,000, divided into 400,000 shares. The officers are: Henry A. McCormick, president; Walter A. Cooke, vice-president; Joseph H. Hurd, secretary; Rodney T. Badger, treasurer, all of Salt Lake City. The company's property consists of 325 acres, near the Utah Consolidated mine.

Silver Shield.—The Highland vein, which has been very prolific in the United States Company's territory, has been struck in this ground.

United States Smelter.—The shipments of copper bullion during the week ending August 28 were three cars, 180,120 lb.

Utah Consolidated Smelter.—The shipments of copper bullion for the week ending August 28 amounted to five cars, 301,000 lb. The copper bullion output for the month will aggregate 1,100,000 lb. The smelter has treated an average of 520 tons per day.

VIRGINIA.

HALIFAX COUNTY.

(*From Our Special Correspondent.*)

What seems to be an important gold discovery has been made 4 miles north of Virgilina by H. C. Crowell, who says the vein is 3 to 5 ft. wide and that a shaft 20 ft. deep has produced 30 tons assaying $100 per ton. The vein is opened at three places over a length of 700 ft.

WEST VIRGINIA.

MARION COUNTY.

Powell Coal and Coke Company.—This company is building 100 coke ovens at Powell station, erecting crusher, washer houses, etc., and opening up mines. The company has offices in the Farmers' Bank Building, Pittsburg.

FOREIGN MINING NEWS.

CANADA.

BRITISH COLUMBIA—BOUNDARY DISTRICT.

Ore Shipments.—The shipments for the week ending August 29 were as follows: Granby mines to Granby smelter, 8,088 tons; Snow Shoe to Sunset smelter, 2,130 tons; Mother Lode to Greenwood, 3,904 tons; Sunset to Sunset smelter, 570 tons; Emma to Trail smelter, 540 tons; Oro Denoro to Sunset smelter, 730 tons; Athelstan to Sunset smelter, 180 tons. Total for the week, 16,062 tons. Total for the year to date, 393,107 tons.

BRITISH COLUMBIA—LARDEAU DISTRICT.

Eva.—This stamp mill is rapidly nearing completion. Crushers are in place and stamps ready to drop. The 4 vanners are set up and the floor in the vanner room laid. Shafting is being put in place and the three Pelton wheels are in position. The house covering the lower terminal is almost completed. At the mine three shifts of men are at work and good headway is being made.

Ophir-Lode.—The main parts of the compressor plant are in position, the air pipe is nearing completion and the building is being covered with metal roof. At the mill, crusher and stamps are in place, and the tram cable is being put in position. Grading for the reservoir is finished and timbers are being framed.

BRITISH COLUMBIA—ROSSLAND DISTRICT.

Rossland Ore Shipments.—The carnival holiday interfered with one shipment from the camp for the week ending August 29, but a fair output was attained. Le Roi shipped 3,510 tons; Centre Star, 1,650; War Eagle, 1,059; Kootenay, 270; Le Roi No. 2, 210; Giant, 20; Jumbo, 150; Spitze, 30. Total for week, 6,890, and for the year to date, [illegible],347 tons.

Le Roi.—Manager Parrish announced that a net loss of $1,500 was incurred during July. His cablegram to London is reported to have contained the following: "Shipped to the Northport smelter during the month 11,116 tons of ore, containing 3,776 oz. of gold, 4,011 oz. of silver, 191,600 lb. copper, resulting in a loss of $7,000. Shipped from the dump to the Northport smelter during the month 2,325 tons of ore, containing 716 oz. of gold, 924 oz. of silver, 30,127 lb. copper, estimated profit on this ore, $5,500."

YUKON.

Advices from the Klondike region are that many claims have had to close down owing to lack of water, throwing several hundred men out of work. Hundreds of men have already left the creeks for Dawson and are starting to go "outside." The water in the river is lower than ever known at this season and steamer navigation is difficult.

At Klondike and in the camps along the Yukon small coins are now in use, though dimes and nickels are not regarded with favor, the owners apparently wanting no coin smaller than a 25c. piece.

A quartz mill was put up in the Klondike region last year as an experiment. It was not successful and has been dismantled. The numerous small quartz seams in the slate bed-work of the gravel claims are uniformly barren. The larger veins found are too low grade to pay.

A ditch 15 miles long, capable of carrying 5,000 in. of water, is being dug along Salmon river by D. F. Lane and others.

On No. 8, below, on Salmon river, a dredger is operating with good results, being the first of the kind introduced in the Nome diggings.

Gold King.—The sale of this property, on Josephine creek, in the Klondike region, is reported to J. A. T. Evans and others, of Ft. Worth, Tex. The property is said to have a rich vein of quartz exposed and a 2-stamp mill now on the ground. The Gold King Mining Company was the former owner.

MINING STOCKS.

(Full quotations are given on pages 414 and 415.)

New York. **Sept. 9.**

The holiday on 'change from Friday afternoon last to Tuesday morning rather took off the edge of enthusiasm for trading since our previous report. In fact, the vacation seems to have made speculators cautious, and the market is heavy. Without exception stocks have fluctuated within narrow limits, and sales have been comparatively small.

Copper shares were languid, as their leader, Amalgamated, was without particular support. Last Friday Amalgamated closed at $48½@$48⅝, and on Wednesday of this week sold at $47⅛@$48⅜. Anaconda was hardly noticed, and on two days absolutely nothing was done in the stock. On curb the coppers have had a quiet time, wanting some stimulus to awaken them. For a short interval British Columbia showed some business, and on Tuesday sold at $3¼. Greene Consolidated, of Mexico, initiated small trading at $19⅜@$19¼. United of Montana held at $15⅞@$15¾.

In the gold and silver group room traders continue their efforts to revive interest, but owing to the labor troubles in Colorado, outside buying of these shares is limited. Standard Consolidated, of California, which pays its quarterly dividend of 10c. per share on Sept. 24, changed hands at $2.50. Portland, of Cripple Creek, Colo., brought $1.25, and Ophir, on the Comstock Lode, $1.65. Other transactions were chiefly in lower priced stocks that afford opportunity for making fractional profits on match orders.

Boston. **Sept. 8.**

(*From Our Special Correspondent.*)

The triple holiday tended to restrict business in this market, although a firm tone has prevailed during the week. As would naturally be expected, Copper Range Consolidated has held the center of the speculative stage, yet the movements have been narrow and see-saw. The extreme fluctuation has been $64@$66.75, closing a fraction better than a week back at $65.87½. The unexpected announcement that the Trimountain directors had all resigned in a body and were replaced by Copper Range interests had a depressing effect on the former. Trimountain touched $70, but subsequently rallied to $77, and fell back to $73. On the official announcement to-day that the Trimountain would be taken over share for share the bid price was $66, with stock offered at $73, but no sales.

Copper Range, in taking over the Trimountain, will increase its capital $10,000,000 to $38,500,000. It will then purchase 70,000 shares of Trimountain stock from A. C. Burrage, who represents himself and others paying share for share in stock. This privilege will also be extended to minority interests. It can be seen that a favorable opportunity is presented for a speculative upturn in Copper Range.

Daly West advanced $2, to $42, on the 5c. increase in the monthly dividend to 65c. Old Dominion broke $1.75 to $9.25 on rumors that the stock might be assessed to raise necessary funds rather than issuing bonds. Tamarack took a $13 jump to $113, and Calumet & Hecla advanced $10 to $475. Quincy declined $1 to $89, and Mohawk $1.50 to $42.

Dominion Coal has fallen $5.50 to $80, while Dominion Iron and Steel, in a burst of activity, has gone up $5.25 to $14.50. It seems that in the deal breaking the lease of the former to the latter company it is said the coal company is to reimburse the steel company for about $2,635,000 spent in better results on the coal property, and give a bonus of a large amount of money. The coal contract is also to be modified. This will leave the steel company's floating debt about $2,000,000, against which the directors have agreed to take $1,500,000 second mortgage bonds at par.

Utah Consolidated has been quiet at from $27.50 to $28, and United States at around $20. The latter has blown in its fourth furnace. Centennial holds quiet around $20.75@$20, and Bingham at $26@$25.75.

Colorado Springs. **Sept. 4.**

(*From Our Special Correspondent.*)

The market this week has in a measure justified the expectations of the brokers as to prices, the volume of trading, however, remaining about the same. The leaders maintained the advance of last week, and a majority of them made further gains. The miners' strike in the Cripple Creek district is still in effect, and it is not expected that any stock will score a marked advance until this is settled. The large drainage bore was completed this week, and it is likely that this will have a bullish effect on prices in the very near future. On account of the labor troubles, the production of the camp was last month curtailed to a considerable extent.

Anaconda, one of the old timers in the camp, was traded in this week, at advanced prices; a week ago the stock sold at 10⅝c., while yesterday sales were made

at 12. C. K. & N. sold from 17¼ to 18½ and back to 17, when its books were closed for a dividend of 1c. per share. Elkton sagged somewhat during the week; a week ago 42 was bid for this stock, while to-day it was offered at that price. El Paso was strong all week, and at higher prices. A week ago 58½ was the bid price, while 59¾ was bid at the close to-day, and selling at 60. Gold Dollar Consolidated was a popular trader, advancing from 4¼ a week ago to 4½ to-day. Gould was a heavy trader and scored a substantial advance, the bid last week being 1⅞, while to-day 2⅜ was the bid and selling price. Isabella made a good gain over last week, advancing from 11¼ bid to 12 bid to-day, with no stock offered even at the advanced figure. Portland was stationary all week at $1.22, with but little stock changing hands. The trading in the prospect and miscellaneous lists was light, but prices were strong.

San Francisco. Sept. 5.

(From Our Special Correspondent.)

On the old Exchange a slight demand for Ophir made matters lively for a day or so, but prices then fell off and closed rather weak. Some quotations noted are: Consolidated California & Virginia, $1.50 @$1.55; Ophir, $1.65@$1.75; Mexican, $1.05@$1.10; Silver Hill, 72c.; Sierra Nevada, 64c.; Gould & Curry, 27c.; Savage, 23c.

On the San Francisco & Tonopah Exchange business was rather quiet, only a few stocks selling freely. At the same time there was no special pressure to sell, and prices were fairly well maintained. Montana Tonopah sold at $1@$1.05; Tonopah North Star, 45c.; Mizpah, 30c.; Esperanza, 4@5c.

On the Oil Exchange buyers were rather backward, and prices weakened a little, except in one or two cases. Caribou sold at 90c.; Home, 90@75c.; Oil City, 28c.; Independence, 18c. The largest business done was in Home and Caribou, the former losing, the latter gaining.

COAL TRADE REVIEW.

New York, Sept. 9.

ANTHRACITE.

There has been no change in the general condition of the anthracite trade during the past week, and none seems likely to come before cold weather. In the aggregate a large tonnage is still going forward, particularly to Western points and to New England, but the market is distinctly quiet. A press dispatch, which stated that the companies were to restrict output this month to 3,000,000 tons was, however, premature, to say the least. There is nothing to indicate any concerted effort to restrict production, and in fact, it is altogether unlikely that such a project has even been discussed. The truth of the matter is that the mines, since they resumed work last October and November, have been running as nearly full time as possible, and mine superintendents have forced output. The result is that there is not only a lot of dead work to be done under ground, but surface plants are in need of more or less extensive repairs. Now that the demand for coal has fallen off, every company will shut down temporarily colliery after colliery to make these repairs.

The decision of Carroll D. Wright, in the matter of miners discharged by certain companies, seems as fair a decision as could possibly be expected. It may not please some of the more hot-headed officials of the miners' union, and doubtless there may be talk of not abiding by the findings of the Conciliation Committee, but it is altogether unlikely that the wiser leaders will countenance another strike, as they must realize that public opinion would be overwhelmingly against them.

The total production of coal for August is estimated at 5,300,000 tons, and for the year to September 1 at 42,550,000 tons. This total compares with 49,395,936 tons in 1902, and 35,772,518 tons in 1901. The movement of coal up the Lakes is heavy, and rail shipments from docks at the head of the lakes hardly keep up with receipts. In Chicago territory trade is very quiet. Little change is to be expected during this month. Much of the coal arriving all-rail is being stored by the companies' representatives. Sales agents say that demand will be dull until well into October. Along the lower lakes and in Canadian territory trade is quiet, as it is the line trade farther east. Along the seaboard a considerable tonnage is arriving at the shoal water points beyond Cape Cod. It is reported that the movement is somewhat hampered by the supply of small vessels and barges, though it is possible that the movement would be heavier were vessel rates lower. Demand at New York Harbor points and at Philadelphia is light, though an improvement in retail demand is expected with the return of householders from vacations. Steam sizes continue in oversupply, and the demand for broken might be much better.

BITUMINOUS.

The Atlantic seaboard bituminous trade is quiet, though current quotations are little affected, apparently because producers of the various grades do not care to sell for less, and it is a question whether they will not restrict production somewhat rather than reduce prices any. Current prices, f. o. b. New York harbor shipping port, range from $2.40@$2.50 for gas slack, to $3 for the better grades of Clearfield, while special coals range as high as $3.75. The small sizes of anthracite apparently affect the market for bituminous, but the chief factor at present is the lack of demand, and this is felt much more by the larger number of producers in the market than a year ago. It is altogether likely that next spring prices will not be put up as they were last spring, not only bringing prices closer to current figures, but keeping many producers from cutting prices somewhat while trying to keep as close as possible to circular figures.

Trade in the far East is quiet, even consumers at the shoal water ports being disinclined to take much coal just now. It is thought that shipments on contracts are fully up to allottments, and it is possible that many consumers may be waiting for lower ocean freights before filling the balances of their contracts. Along Long Island Sound trade is better than it was, as the settlement of labor difficulties brings consumers in the market again. In the aggregate a considerable tonnage is going forward to out-of-the-way ports in that territory. New York harbor trade is inactive, and consumers are not inclined to take much coal, they preferring rather to let the small stocks they have run down. All-rail trade is little changed and, if anything is quieter. Prices in that territory have shown some cutting within the past 10 days.

Transportation from the mines to tidewater is regular and coal comes through in less than a week. Car-supply at the mines is sufficient for all demands. It is thought that any shipper wanting cars can get without trouble enough for 75 per cent of his productive capacity. In the coastwise vessel market vessels are in fair supply, and brokers report the market inactive. We quote current rates from Philadelphia as follows: Providence, New Bedford and Long Island Sound, 70c.; Boston, Salem and Portland, 85c.; Portsmouth and Bath, 90c.; Lynn and Gardiner, $1.05, with towages to latter port; Newburyport, $1.10; Saco, $1.15 and towages. Rates from the further lower ports are 5c. higher than above figures. From New York harbor rates are 65@70c. to Providence, New Bedford and Long Island Sound, and 75@80c. to points around Cape Cod.

Birmingham. Sept. 7.

(From Our Special Correspondent.)

With those mines affected by the arbitration board there is some little unrest on one side or the other, though so far no serious conflict has arisen. The new provisions in the contract are just now becoming effective. Already there is some intimation of a car shortage, though the railroad officials aver that they are filling all requests for cars. Minor troubles with labor exist at a few places in Jefferson County. In the main, coal production in Alabama is healthy, with prospects of a steady continuation for several months to come.

The reported consolidation of the Monongahela River and Pittsburg coal concerns in Pennsylvania will hardly affect the operations of the Corona mines in Alabama belonging to the Monongahela River Company. These mines have been in active operation since the Pennsylvania folks have controlled them, the product being used mostly on the Mississippi River trade.

Announcement is made that the electrical haulage system in Mine No. 3, of the Tennessee Coal, Iron & Railroad Company's Pratt mines, is not the success that was anticipated, and there is probability that the system will be withdrawn, though it is to be given further trial before the final decision is arrived at. The mine formerly had an output of something like 900 to 1,200 tons of coal a day. It is asserted that since the electrical haulage system has been installed the daily production has not run over 200 tons. One man and a mule have been killed by the new system.

Reports heard from new mines being developed are most favorable and the completion of railroad extensions will mean more mines in operation. A report from Gadsden announces that Chicago people are behind the movement to develop on an extensive scale coal lands near Altoona, in Blount County, on the new line being built by the Louisville & Nashville railroad from Altoona to Attalla. Twelve openings are intended and efforts will be made to get something like 200 to 250 tons of coal from each opening. Further development is reported contemplated in Bibb county, though no definite statement is made as yet.

Chicago. Sept. 7.

(From Our Special Correspondent.)

Decided dullness exists in the anthracite business. The beginning of the first month of autumn finds wholesalers competing actively for business and consumers either disinclined to buy because of a feeling that prices will not be higher anyway, or because they are well stocked for the winter. There will be, in the opinion of leading wholesalers, no activity in the anthracite section of western business before the latter part of October. Dock stocks are large, but the transportation question causes much apprehension. If transportation continues good there will be no trouble with the supply of both anthracite and bituminous next winter, but according to the present outlook it will not be good. The lack of cars does not seem likely to be remedied. Receipts of anthracite by vessel are also falling off because of the scarcity of vessels; this condition, if it continues, will diminish the large dock stocks and possibly give a little briskness to the trade. There is every evidence that the condition of the market now is due to the consumer rather than the retailer, who generally professes to be anxious to buy if he can in turn dispose of his stock promptly.

The advance of 10c. September 1 makes the car price of egg, stove and chestnut anthracite now $6.50, and of grate $6.25. This is probably the last advance in the net price that will be made this year. There is much newspaper criticism of the graduated monthly discount system, but it has worked well for both the trade and the public, in equalizing purchases. This month's final advance seems to have had little effect upon either wholesale or retail business. As compared with a year ago the autumn price is 50c. higher, a difference that has existed since last spring.

There is as yet no great change in the bituminous market. It continues sluggish. Hocking is falling off and shipments are being curtailed; the price remains $3.90 for lump and $3.65 for run-of-mine. Cuts are probably being made on Hocking of 15@25c. Smokeless likewise is not holding up to schedule price of $4.40 for lump and $3.90 for run-of-mine. The smokeless market seems bound to remain dull until the end of autumn. Youghiogheny is in steady though not strong demand at $3.70@$3.80; Pittsburg lump brings the same price. Indiana block is not in so good demand, under the advanced price, but sells fairly well at $3.30. Illinois and Indiana lump and egg are at $2.35@$2.60; run-of-mine at $2.25@$3. In general, Western grades are in light demand, even for the season.

Cleveland. Sept. 7.

(From Our Special Correspondent.)

The coal trade of the lake region is very heavy and is improving. As far as lake shipments are concerned, it was said to-day that shippers have never sent greater quantities of coal up the lakes in a similar period. The receipts from the mines have been very heavy and the shipments up the lakes have been commensurate. Shippers seem to have avoided the difficulty which confronted them a short time ago—that of a congested condition in the upper lake region—and are shipping material very freely. The boats employed in the trade have been moving freely. They have been of greater number because the lake coal and ore trades are now employing all the tonnage formerly employed by the general trade. Lake rates of carriage have remained stable, being 50c. to Lake Michigan and 40c. to Lake Superior. The supply of coal to the factories in this territory has likewise been very much improved, and the concerns now starting up have been buying freely. This has supplied a better demand for steam coal and is removing one of the weak spots of the market. The call for domestic coal has also been better and sales have increased. Shippers are still talking of a shortage of fuel, in the face of the seemingly over-produced state of the market in the anthracite fields. The Cleveland market has not taken much stock in that story and the efforts to raise prices have not been encouraged in the least. The market is therefore stable and firm, but not aggressive. Coke supply in the Valleys is sufficient for immediate requirements of the furnaces, but it is noticed that the concerns are not able to collect any stocks to speak of. The whole state of the market seems to be firm.

Pittsburg. Sept. 8.

(From Our Special Correspondent.)

Coal.—There is no change in the markets. Prices remain firm and the production is a trfle over half the capacity of the mines dependent on the railroads for cars. The river mines are in full operation, with plenty of empty coal boats and barges to load. Shipments to the lake ports are being made as rapidly as the poor transportation facilities will permit. The most important development in the coal industry this week is the practical absorption of the Monongahela River Consolidated Coal & Coke Company, the river combine, by the Pittsburg Coal Company, the railroad combine. The deal was ratified at a meeting of the board of directors of the Pittsburg Coal Company yesterday afternoon. George I. Whitney, of Whitney, Stephenson & Co., brokers, secured options on the majority of the stock of the Monongahela Company, which was turned over to the Pittsburg Coal Company. The details of the transaction are not given; but President Francis L. Robbins made this statement: "The two companies will be operated separately, each under its own charter. There will be no merger whatever. The Pittsburg Coal Company, however, as the owners of the majority of the stock of the river company, will have the control of the latter and will name

the new officers. Just when this will be done is not yet known. It may be some time before the plans are all worked out. The price of the stock will not be announced now." In speaking of the reported railroad deal Mr. Robbins said: "When this matter is in shape for presentation it will be referred to the stockholders of the company for their approval. I want them to see and to know that it is the best thing for the good of everybody interested. It might be completed, perhaps, without the approval of the stockholders, but they shall have a chance to know it in full before it is carried through. It may not be ready for 30 days yet, as there is much work in the plan."

Connellsville Coke.—The coke trade is improving and prices are slightly higher, furnace coke being quoted at $2.25@2.50. The *Courier*, in its last report, gives the production for the previous week at 249,000 tons. The shipments were 10,378 cars, as follows: To Pittsburg and river tipples, 3,793 cars; to points west of Pittsburg, 5,079 cars; to points east of Connellsville, 1,506 cars.

San Francisco. Sept. 5.

(*From Our Special Correspondent.*)

Mr. J. W. Harrison's circular, under date of September 1, says that in August 12 vessels arrived at San Francisco from Australian ports, with 36,873 tons of coal. The circular adds:

"There are at present on the chartered list from Newcastle and Sydney, with coal for here, 52 vessels with a carrying capacity of over 160,000 tons. With this amount, and the liberal shipments now being forwarded from British Columbia and Washington, there is no probability of a shortage in fuel requirements for some time. The 27 vessels arriving here from Australia within the last six weeks have reduced the Colonial list for this port very materially, as new names are not being added to replace the names being taken off. Foreign coals will be dropped from the free list, and become again dutiable on January 15, 1904. It is generally believed that the Administration will not modify the present situation, yet importers will naturally be very chary about purchasing freely until they are being taken by our local importers to insure coal remaining undutiable. Their laxity may prove costly to them, as over 80 per cent of our coal is derived from foreign sources. Large consumers become heavy contributors to a change of tariff.

Prices remain steady. Quotations for Pacific Coast coals to dealers are as follows: Wellington and New Wellington, $8; Richmond, $7.50; Roslyn, $7; Seattle and Bryant, $6.50; Beaver Hill and Coos Bay, $5.50; White Ash, $5.25. For Rocky Mountain coals to dealers quotations are: Colorado anthracite, $14; Castle Gate, Clear Creek, Rock Springs and Sunnyside, $8.50. Eastern coals are nominal at $14 for Pennsylvania anthracite and $13 for Cumberland, the latter being rather scarce. For foreign coals, in cargo lots, prices are: Welsh anthracite, $13; Cannel, $8.50; Brymbo and Wallsend, $7.50.

Foreign Coal Trade. Sept. 9.

Exports of coal and coke from the United States for the seven months ending July 31 are reported as below by the Bureau of Statistics of the Department of Commerce and Labor:

	1902.	1903.	Changes.	
Anthracite	619,111	1,339,135	I.	720,024
Bituminous	3,106,092	3,347,826	I.	241,734
Total coal	3,725,203	4,686,961	I.	961,758
Coke	241,653	239,985	D.	1,668
Total	3,966,856	4,926,946	I.	960,090

The coke went chiefly to Mexico; the distribution of the coal exports is shown below:

	1902.	1903.	Changes.	
Canada	2,610,067	3,674,920	I.	1,064,853
Mexico	331,259	474,248	I.	142,989
Cuba	246,064	232,438	D.	13,626
Other West Indies	183,296	130,186	D.	53,110
France	28,865	2,940	D.	25,925
Italy	81,831	36,854	D.	44,977
Other Europe	62,419	13,903	D.	48,516
Other countries	181,402	121,472	D.	59,930
Total	3,725,203	4,686,961	I.	961,758

The increase this year was entirely in the Canadian and Mexican trade. Exports to European countries show a large decrease, the trade to those countries having almost disappeared.

Imports of coal into the United States for the seven months ending July 31 are reported by the Bureau of Statistics as follows:

	1902.	1903.	Changes.	
Canada	936,380	1,040,067	I.	103,687
Mexico	7,732	5	D.	7,727
Great Britain	43,455	1,220,506	I.	1,177,051
Other Europe	668	381	D.	287
Japan	8,176	28,879	I.	20,703
Australia	201,326	169,012	D.	32,314
Other countries	274	1,019	I.	745
Total	1,198,011	2,459,869	I.	1,261,858

Of the imports this year a total of 134,723 tons was classed as anthracite. Imports were chiefly in the earlier months of the year. The total for July was 170,463 tons, a decrease of 4,759 tons from last year.

Messrs. Hull, Blyth & Co., of Cardiff and London, report under date of August 29 that the general tone of the Welsh coal market is firm and unchanged. Best descriptions are very scarce for September shipment. Quotations are: Best Welsh steam coal, $3.96@$4.02; seconds, $3.90; thirds, $3.66; dry coals, $3.36; best Monmouthshire, $3.36@$3.48; seconds, $3.30; best small steam coal, $2.22; seconds, $2.10; other sorts, $1.92.

The above prices for Cardiff coals are all f. o. b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f. o. b. Newport, exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days, less 2½ per cent discount.

The freight market is unchanged. Tonnage is plentiful. Some rates quoted from Cardiff are: Marseilles, $1.15; Genoa, $1.08; Naples, $1.08; Singapore, $2.46; Las Palmas, $1.44; St. Vincent, $1.56; Rio Janeiro, $2.28; Santos, $2.52; Buenos Ayres, $2.04.

IRON TRADE REVIEW.

New York, Sept. 9.

The iron trade presents varied and somewhat disappointing conditions. In pig iron, business in bessemer and basic brands is very quiet. Little is being done by outside buyers, and the Steel Corporation has not yet brought forward its later requirements. Foundry sells in a moderate way, chiefly in small lots for early delivery, but the aggregate makes up a considerable quantity. Southern furnaces are still competing for business, and it is understood that sales have been made as low as $11.25, Birmingham, for No. 2 foundry. Reports are, however, that buying is somewhat better, and the accumulation of iron has ceased for the present.

In finished material about the only incident is the active purchasing of bars and the competition for orders. Bars have been sold as low as 1.50c. Youngstown, and orders for considerable quantities have been placed. Plates are dull, and structural material is also quiet. In fact, the structural trade seems to have been killed for the season by the building strikes. There has been a very heavy demand for pipes and tubes.

Blast furnace production continues to fall off slightly, as a number of stacks are going out for repairs. Many furnaces have had a long and arduous campaign, and repairs are now a matter of necessity. In a few cases furnaces which have been running on high prices are stopping, as they can no longer be worked profitably. The output is still very large, but not on the high scale of a few months ago.

Little is heard just now of import business, and the trade coming in is mainly on low contracts. German steel is offered in the East at $1 below prices of domestic billets.

Birmingham. Sept. 7.

(*From Our Special Correspondent.*)

The Alabama furnacemen are receiving small orders for iron right along, the aggregate being fairly good. In fact, the demand is almost equal to the production, which means that the accumulation of iron has been stopped. There is no iron bought for speculative purposes at present, and judging from the size of the orders being received, there is but little iron being stacked up in yards by the consumers. The furnacemen in this section were somewhat disappointed because the Southern Iron Committee, which is composed of the railroads handling the traffic, did not grant their request for a reduction of 50c. per ton on iron and kindred products. The meeting of the Iron Committee was held in this city last Friday and prominent furnacemen appeared before the members and made statements. It was argued that an advance of 50c. per ton was made in freight rates when iron went above $12 per ton for No. 2 foundry, and now that it had dropped to that figure and below again the advance should be taken off. It was also stated that if the reduction in freight rates would be given the furnacemen could ship out in a few months much of the 150,000 tons of accumulated iron to be found on the yards hereabout. The railroad officials, after considering the request, did not think this time opportune for a reduction. Intimation is given, however, that a little later, should there be no improvement in the iron market conditions, the matter may again be taken up.

There is talk heard that present prices on iron are being cut. A statement was made that the present price of $12 per ton for No. 2 foundry was being cut from 25 to 50c. per ton when large orders were placed. Whether any sales have been made at this price is not admitted, but it is possible that such is the case.

The Tennessee Coal, Iron & Railroad Company last week blew in another furnace at Bessemer, near here. The company now has five furnaces in blast at Bessemer, three at Ensley, one in Birmingham and one at Oxmoor, all in Jefferson county. The Sloss-Sheffield Steel and Iron Company has six of its seven furnaces in operation. There are 27 furnaces in operation in Alabama, including three charcoal furnaces.

The following iron quotations are given: No. 1 foundry, $12.50; No. 2 foundry, $12; No. 3 foundry, $11.50; No. 4 foundry, $11; gray forge, $10.50; No. 1 soft, $12.50; No. 2 soft, $12.

In finished iron and steel conditions are not so favorable. The Gate City rolling mills, belonging to the Republic Iron and Steel Company, have been in steady operation ever since they resumed work, four weeks since. The Bessemer mills, belonging to the Tennessee Coal, Iron and Railroad Company, shut down the latter part of the past week to permit some repairs and it is stated that work will resume at this plant on September 8. The Birmingham mills, belonging to the Republic Iron and Steel Company, have not resumed operations yet. Numerous repairs are being made to this plant.

The steel plant and steel plow works, both in Ensley, are doing well, with good orders on hand for their respective products. The demand for steel billets and steel rail is good and steel rail is being shipped out as rapidly as it is being manufactured.

Chicago. Sept. 7.

(*From Our Special Correspondent.*)

It is a slow climb, but apparently it is a climb that the pig iron market is taking from the depths of a month ago. Sales are increasing, but slowly, and prices show an obstinate tendency to stick to the bottom value represented by $11.50@$12 Birmingham for Southern No. 2, or $15.85@$16.35 Chicago. Perhaps on general business these quotations have advanced 50c. for No. 2, with No. 1 50c. higher and No. 3 50c. lower than No. 2. The volume of sales does not indicate anything but a continuation of the climbing process; but the size of orders is increasing, indicating a healthier tone to the market. As yet many buyers cling to the small-order, quick-delivery plan that has characterized the market for the last six months. Yet many furnaces are now reaching well into 1904, with contracts, and the time between order and delivery is gradually lengthening. Northern iron in general is $1 higher than Southern.

There is much apprehension about the transportation condition in the near future. From the local outlook there is bound to be much difficulty as soon as the autumn traffic has well commenced, and the iron market usually feels the worst part of the famine of rolling stock and is tied up most by the congesting of traffic. Already trouble enough exists for the firms that are doing most of the business. This is likely to make orders somewhat larger, judging from previous effects upon the trade.

Coke continues plentiful, but with the supply better regulated than last week and prices a little firmer, first class 72-hour foundry selling at $5.50@$5.90.

Cleveland. Sept. 7.

(*From Our Special Correspondent.*)

Iron Ore.—No sales have been reported during the past week and the market has remained dull. The movement down the lakes is as heavy as the shippers desire, there being a surplus of tonnage. The prices are nominally as they have been, $4.50 for bessemer old range and $4 for bessemer Mesabi. The rates of carriage on the lakes have also been as they were, 80c. from Duluth, other rates being proportionately lower.

Pig Iron.—The sale of foundry pig iron continues to be confined to transactions requiring immediate delivery. The largest sales are of 500 tons, but few, if any, exceeding that. The inquiry for fourth quarter material is, however, very much better, and the market seems to be gathering strength, from the buying end of it. However, sellers are still in conflict, with further doubt as to prices. The Southern furnaces are competing sharply, and have cut the price in places to $11 Birmingham. In addition an effort is being made to have the railroads reduce the rate 50c. a ton between Birmingham and Cleveland. These two reductions would bring the material much more cheaply into this territory and force another reduction in Valley iron, which is already weak at $16 in the Valleys. Meanwhile, the selling of big lots of pig iron has been suspended and the market is extremely dull, as far as the future is concerned. Immediate consumption is heavy. Malleable is in good demand at $16.50 in the Valleys and gray forge is selling at $16 in the Valleys for small lots. Inquiries for bessemer have been coming in from the independent consumers, but the Steel Corporation has not bought anything, nor has its inquiry been received. The price holds nominally at $18 in the Valleys. The basic market is dull, with nothing either in present or prospective future sales to indicate any pronounced state of activity. The price is nominally $18 in the Valley.

Finished Material.—The whole market seems to be centered in the bar situation. The controversy that has been going on over those prices has exceeded everything in interest. The market has settled down after a protracted spell of uncertainty, and now bar

iron is being universally sold on the basis of 1.50c. at the mill, a few exceptions being noted where local conditions permit a slightly higher price. The belief now is that after the controversy the mills have stopped shipping steel bars on iron contracts. The steel situation is therefore stronger on the basis of 1.60c. for bessemer and 1.70c. Pittsburg, for open-hearth. The production is heavy and the sales have been larger than in any other line of the trade. The sheet trade is a little stronger. The sales have been heavier, both from mill and out of stock, and the whole tone of the market is improved. Small mills are not cutting the prices so vigorously as they have done heretofore and even the larger mills are able to fill up without any serious transgression of the price list announced by the association. The market is, however, far from vigorous. Prices rule as they have been heretofore quoted, being based on 3.05c. for No. 27 black sheets out of stock, and 2.75c. for the same material in car-lots at the mills. The plate trade is dull and lifeless. The larger mills are getting enough business in small lots to keep them busy, but they have not booked any contracts for any length of time in future. New orders with light specifications are keeping the mills busy. The structural trade is about represented by the statements made in presenting the plate trade. The labor difficulties have killed that line of business for this year. Prices hold nominally at 1.60c. Pittsburg on mill sales and 2.15c. out of stock. There is a slight inquiry for rails, but the business is in future a good distance. The market for billets has been a little firmer, but the trade has been by no means active, the independents doing most of the business.

New York. Sept. 9.

Pig Iron.—Demand continues quiet. We quote: No. 1X foundry, $17@$17.50; No. 2X, $16.50@$17, while No. 2 plain can be had for 50c. less; gray forge, $15.50@$16. For Southern iron, on dock, quotations are: No. 1 foundry, $17; No. 2, $16.25; No. 3, $15.75.

Plates.—The local market is unchanged. Buying is in small orders. Sheared plates are quoted as follows: Tank, ¼-in. and heavier, 1.78@1.85c.; flange, 1.90@2c.; marine, 2.05@2.10c.

Bar Iron and Steel.—Prices for large lots on dock are: Refined bars, 1.70@1.90c.; soft steel bars, 1.75@1.80c.

Steel Rails.—The quotations remain $28 for standard sections, f. o. b. mills; light rails, $33@$36, according to weight. Relaying rails are $28@$33 for heavy sections and $33@$38 for light sections.

Structural Material.—Demand has not improved much. For large lots at tidewater, nominal quotations continue 1.75@2c. for beams, angles, channels and tees.

Philadelphia. Sept. 9.

(*From Our Special Correspondent.*)

Pig Iron.—The anticipations of a good many buyers have been realized in the further shrinking of foundry iron during the past few days. It should be mentioned that this shrinking is not recognized by two or three strong companies, who say that there is no legitimate occasion for any other weakness, and that if buyers want their iron they will have to pay their prices for it or go without. In view of this fact there is quite a dissimilarity in quotations and therefore those quoted below can hardly be regarded as strictly accurate. Buyers for some time past have been acting in a very stubborn manner, purchasing very little material and even now with the sudden drop they are not taking hold as sellers think they should. The very fact of a decline in the face of statements that no decline was probable has made them more suspicious. Rumors reach this market of possible cuts in Western and Southern markets. The effect of this is an unsettled feeling. Quotations may be given as approximately at $18 for No. 1 foundry, $16.50 for No. 2, $15.50 for No. 2 plain, $15@$15.25 for standard mill iron, and $15.50 for basic.

Steel Billets.—There are further rumors of an impending cut in steel billets and this has had the effect of holding off buyers. Rumors were circulated here a week ago that a cut of $2 or $3 in billets was imminent, and the rumor has had the effect of making all buyers rather suspicious. We have been unable to get at the bottom facts, and at present writing are awaiting developments, which they believe will transpire very soon. Further offers of German steel have just been made at about $27, duty paid.

Merchant Bar.—The unevenness of prices referred to is more pronounced this week. Two or three large concerns have made a quiet cut and have secured considerable business. Some other cuts are expected, but the retail trade will probably not profit much by it. Bars are quoted nominal at 1.60@1.75c. Several lots of common iron have been taken, but quotations are held strictly under the ban of secrecy.

Merchant Steel.—Quite a number of small lots of merchant steel have been purchased and distributors are now accumulating stocks for coming requirements which they believe will be quite heavy. If there are any shadings in merchant steel they are not known, and evidently they are not being made to buyers of small lots.

Pipe.—Several good-sized orders for pipe have been placed and more are on the way. The demand for pipes is quite heavy, and the representatives of mills say business is in first-class shape.

Tubes.—The consumption of tubes is very heavy and consumers are now placing orders for future delivery. It is claimed that some shadings have been made on these orders, but it is impossible to verify the fact.

Nails.—The retail demand for nails has improved materially during the past few days, and the country trade has developed most satisfactorily.

Structural Material.—Conditions remain just about the same. Quotations are unchanged and are given at 1.73½@1.80c. for beams, channels and angles in large lots.

Old Rails.—Old rails are very quiet and held strongly at $19.50 for iron and $17 for steel.

Scrap.—Several lots of machinery scrap were taken at $15; country scrap is very scarce and is quoted at $15.50. Heavy steel srap is held at $15.26; wrought turnings heavy, $13 to $13.50. No. 2 light scrap is $16.

Pittsburg. Sept. 8

(*From Our Special Correspondent.*)

There is no change in the pig iron market, but an improvement is noticed in some finished lines. Bessemer and forge grades are extremely slow, buying being only for immediate requirements, while in foundry iron there has been a good run of small orders mostly in car-loads to 200-ton lots. The Southern furnaces are making a strong effort to get what little foundry trade there is in the Pittsburg district, and have again shaded prices on the No. 2 grade to $11.25, Birmingham. With the expected cut in the freight rate from $4.85 to $4.35, this grade of iron could be put in Pittsburg at $15.60, or nearly $1 a ton less than sales of the local product have been made. This is not a good market for Southern iron, however, as the Northern product has the preference here and commands a higher price. While a few small sales of bessemer pig iron for immediate delivery have been made at $16.50, Valley furnaces, on regular contracts furnaces continue to quote $17, Valley, and it is believed only a limited tonnage is available at the lower price. The number of idle furnaces remains at about a dozen. Several furnaces that went out for re-lining a few weeks ago are again in blast, but others closed for repairs, and all are not likely to be in operation until the situation brightens. The National Association of Blast Furnace Workers and Smelters held its annual convention in Youngstown during the week and the question of 8-hour turns was again agitated. The sentiment of the delegates was strongly in favor of making the demand, to take effect on May 1, 1904, but the matter was finally left to the discretion of the officers. James McMahon, who has been president of the organization since it was formed three years ago, was re-elected, as were the other national officers. The next convention will be held in St. Louis.

Merchant pipe leads all other lines in activity, the demand during the week being unprecedented. It is said there is at present the greatest demand for tubes ever known in the history of the business. The plants of the National Tube Company, as well as the independent concerns, are running to their fullest capacity with one exception. A fire occurred early Sunday morning at the works of the A. M. Byers Company, on the South Side, destroying several mills and damaging others. Repairs will be made as promptly as possible. Orders for pipe have been booked for several months ahead, and a number of inquiries are under advisement for deliveries extending into February. The market for wire products also is remarkably active, and the prospects are very bright for the rest of the year. Large sales of merchant steel bars continue to be made, the tonnage sold during the week aggregating upwards of 20,000 tons. Inquiries are in the market for from 30,000 to 40,000 tons. Plate specifications have improved slightly, but trade is still in a very unsatisfactory condition. In structual material there is a marked improvement, due probably to the adjustment of strikes in the East. All work in the building lines was suspended yesterday on account of Labor Day. The structural iron workers led the parade, and showed the full strength in the district. The membership of the local organization is about 2,000, but fully 2,500 workers were in line. This was explained from the fact that work on the big contracts here is being rushed, and hundreds of men from other sections have been brought here for this purpose.

The special convention of sheet mill workers called by the Amalgamated Association of Iron, Steel & Tin Workers to consider the advisability of removing the limit of production, in order to enable independent union concerns to get some of the business, adjourned without doing anything. A number of independent sheet manufacturers attended the convention, and urged upon the delegates the necessity of removing the limit to give them an opportunity of competing with the largest producer, the American Sheet Steel Company, which has no limit at its non-union mills. The failure of the delegates to take the desired action is attributed to the absence of President T. J. Shaffer, who has mysteriously disappeared. He has not been heard from at the national headquarters for two weeks. It is reported that the advisory board will demand his resignation. It has been learned to-day that he is in Poughkeepsie, N. Y. Mr. Shaffer also called a convention of the vice-presidents, which was held in Cleveland, but he did not attend. At this meeting some of the clauses in the annual wage scale that are not clear were interpreted. Clause 5 of the memorandum of agreement was defined as meaning that all guide, hoop, bar, tin and sheet mills shall not start earlier than 5 a. m. Monday, and finish after the first turn on Saturday. Several other clauses of minor importance were interpreted. The sheet convention adopted the following resolution: "Resolved, That a committee of 11 sheet-mill men be appointed consisting of two rollers, two heaters, two shearmen, one rougher, one catcher, one pair-heater, one matcher and one doubler, for the purpose of formulating a scale based on a tonnage system for all sheet-mill men. Committee to meet not later than February 15, 1904, in the national office. Committees report to be published in program for consideration at the Cleveland convention."

Pig Iron.—Sales of bessemer pig iron have been very light, the price for immediate shipment being $16.50, Valley furnace. No sales of gray forge of any consequence were made, and it is believed as low as $15.50, Pittsburg, can be done. A number of small lots of foundry No. 2 were sold during the week at prices ranging from $16.50 to $16.75, Pittsburg.

Steel.—Small orders for bessemer billets and sheet-bars were received during the week at the agreed price of $27 for billets and $1 more for sheet-bars. Plates show a little improvement, and steel bars are very active. The price remains firm at 1.60c.

Sheets.—There is but little change in the sheet market. While the official price of No. 28 gauge black sheets remains at 2.75c., it is reported that 2.70c. can be done. Galvanized sheets are 3.85c., but this price also is reported to have been shaded.

Ferro-Manganese.—Domestic 80 per cent is a trifle firmer this week, being quoted at $49. The foreign product can be had at a shade lower rate.

Cartagena, Spain. Aug. 22.

(*Special Report of Barrington & Holt.*)

Iron and Manganiferous Ores.—There has been no difference in the tone of the iron ore trade. The market continues very quiet, and little business has been done, though a few odd cargoes of dry and manganiferous ores have been sold for prompt shipment. Freights continue firm, and until they weaken there is no probability of heavy shipments. The only cargo reported for the week was one of 2,100 tons manganiferous ore shipped to Great Britain.

Prices are firm at 6s. 9d.@7s. per ton, f. o. b. shipping port, for ordinary 50 per cent ore; 7s. 3d.@7s. 9d. for special low phosphorus; 9s. 3d. for 58 per cent specular ore. Magnetic ore, 60 per cent iron, is 11s. 6d. for lump and 9s. 6d. for smalls. Manganiferous ores range from 14s. 6d. for 20 per cent manganese and 20 iron to 9s. 9d. for 12 manganese and 35 iron.

Pyrites.—Iron pyrites 40 per cent iron and 43 per cent sulphur are quoted at 10s. 6d. per ton, f. o. b., Cartagena.

CHEMICALS AND MINERALS.

(See also Prices Current, page 416.)

New York, Sept. 10.

A more hopeful feeling is manifest, but the hesitation shown by manufacturers of bleaching powder and other leading chemicals to quote prices for next year's deliveries prevents consumers from placing their orders. It is generally believed that better prices will prevail in future for the heavy chemicals, and unless consumption is curtailed raw materials will continue at their present high level.

Further particulars regarding the renewal of the German potash syndicate to be agreed upon next month intimate that the new compact is for a term of 10 years from January 1, 1905. The organization will not be a syndicate, but a joint-stock company. A managing committee, consisting of 7 members, whose chairman will be appointed by the Prussian Ministry

of Commerce and Industry, will fix the nominal capitalization of the combination at 400,000 marks ($95,200), and establish a reserve fund of 5,000,000 marks ($1,190,000) contributed by the subsidiary companies and individual plants. This reserve fund will be increased yearly by deducting 2 per cent. from the selling price of the various products. The money is to be used in acquiring more property, apparently for the purpose of facilitating competition and directly control the markets for potash salts.

The growing consumption of fluorspar has favored an expansion in mining, particularly in Kentucky and other Southern States. In 1902 the production in the United States amounted to 48,018 tons, which is more than was reported in the previous year, and nearly 20,000 tons more than in 1900. Fluorspar is consumed chiefly in the manufacture of acids and chemical compounds.

Glass sand is finding a larger market, particularly in the Central West, where new deposits are being worked at Silica, near Toledo, Ohio, to supply glass works. The analyses of samples from these deposits show the material to be very pure. The value of glass sand in wholesale quantities at New York is about $2.75 a short ton.

Bricks are now being made experimentally from refuse sand from the glass works at Kokomo, Indiana, by the Pittsburg Plate Glass Company.

Cyanide of Potassium.—The market shows only slight variation, both as regards demand and selling prices. At New York importers continue to quote on a basis of 20c. per lb. Shipments from Great Britain to Atlantic ports have recently been made at an average of a little over 16c. f. o. b. British ports.

Bleaching Powder.—The sky seems to be clearing, and as suggested in this column some time ago, it appears that foreign manufacturers are seriously thinking of making a new agreement to stop the demoralizing competition. Whether the agreement will be only among British makers or between them and the Continental is not yet clear. A significant fact that will likely influence an early agreement is the increasing shipments of British bleaching powder to America. At the present the imports from Great Britain constitute fully 80 per cent of the total receipts from all countries. While the plan of reconciling manufacturers abroad is being considered consumers are unable to learn what prices for next year's deliveries will be, though it is said that an advance may be expected. It is interesting to note that the f. o. b. price at Liverpool, England, has dropped 15s. ($3.60) per ton in the past eight months. At New York good foreign bleach may be had at $1.10@$1.12½ per 100 lbs., while domestic holds at 87½c.@$1.05, f. o. b. works. Business on spot is very quiet.

Copper Sulphate.—Prices continue firm on a basis of $4.75@$4.80 per 100 lbs., f. o. b. works. Trade, however, is not active, as the export movement is small.

Acids.—A satisfactory volume of business is being done in most commercial acids, and prices are nominally unchanged.

We quote as below, per 100 lb., unless otherwise specified, for large lots in carboys or bulk (in tank cars), delivered in New York and vicinity:

Muriatic, 18°	$1.50	Oxalic, Com'l..	$5.00@$5.37½
Muriatic, 20°	1.00	Sulphuric, 50°, bulk, ton	13.50@14.50
Muriatic, 22°	1.75	Sulphuric, 60°	1.05
Nitric, 36°	4.37½	bulk, ton	18.00@20.00
Nitric, 38°	4.75	Sulphuric, 66°	1.20
Nitric, 40°	5.00	bulk, ton	21.00@23.00
Nitric, 42°	5.37½		

Brimstone.—Best unmixed seconds have recently sold from dock at $22.75@$23 per ton, while shipments are being booked at $22@$22.25. Best thirds are nominally $1.25 less than seconds. Business outside of regular contracts is limited.

Exports of brimstone from Sicily in July were 29,606 long tons, making a total of 303,400 tons since January, which, compared with the corresponding period last year, shows an increase of 23,232 tons. Of the shipments for the 7 months the United States is credited with 89,468 tons, France 38,525 tons, Germany and Holland 21,378 tons and Italy 36,739 tons, the balance going to various other countries.

The stocks of brimstone at seaports in Sicily on August 1 are reported at 304,255 tons, which are the largest since March, and show a substantial increase over August 1, 1902 and 1901.

Pyrites.—Of late there have been frequent arrivals of Pilley's Island, N. F., iron pyrites, and last week 3,255 tons were reported at New York. Imports of Spanish ore are less frequent than they have been, as most of the larger consumers are well supplied. Prices show no change.

We quote: Domestic pyrites, $5 per ton for lump ore, f. o. b. Atlantic coast mines, and 10c. per unit for fines; sulphur content varies from 42@44 per cent. Spanish pyrites carrying from 46@52 per cent sulphur, are quoted at 11@12c. per unit for lump and 10@10½c. for fines delivered at Atlantic ports.

Nitrate of Soda.—The continued scarcity of nitrate of soda on the coast owing to the increased consumption has put prices to $2.15 per 100 lbs. for spot, $2.10 for arrivals and $2.05 for 1904 receipts.

Sulphate of Ammonia.—Briefly the market is lethargic and prices are easier. Shipments of foreign gas liquor are quoted at $3.05@$3.07½ per 100 lbs., and domestic, $3.02½@$3.05. There is some speculation as regards next year's prices, and it is intimated that the British product will be based on slightly lower prices than are quoted in Liverpool on current deliveries. Exports from Great Britain are less this year than 1902. In July the shipments were 9,886 tons, and in the seven months this year, 95,465 tons, as against 97,925 tons in 1902.

Phosphates.—Tennessee mines are suffering somewhat from a shortage of labor. An experiment is to be made to employ Swedes and other foreign whites with a view of subsequently replacing much of the negro labor now used. How successful this policy will be may be conjectured by the knowledge that white labor is more expensive than negro, and also by the fact that many mines are producing at a comparatively small margin of profit with the cheapest workmen.

Production in Florida and South Carolina is normal, though stocks are comparatively small, particularly of the former grades. Prices remain unchanged.

Shipments of phosphates from Florida by water in the seven months ending July 31, were as follows, in long tons:

	Domestic.	Foreign.	Total.
Hard rock	....	261,859	261,859
Land pebble	91,820	81,431	173,251
Peace River pebble	39,695	....	39,695
Totals	131,515	343,290	474,805

Compared with the corresponding period last year there is an increase of 6,763 tons hard rock, and 36,625 tons Peace River pebble, while land pebble shows a falling off of 39,809 tons, making the increase in the total shipments only 3,579 tons.

The destination of the foreign shipments this year was principally as follows: Germany and Holland, 191,541 tons; Great Britain, 41,401 tons; Belgium, 22,348 tons, and Sweden, 28,458 tons.

The more important shippers of domestic and foreign phosphates from Florida this year were: Schilmann & Bene, 77,357 tons; Dutton Phosphate Company, 76,917 tons; Palmetto Phosphate Company, 61,399 tons; J. Buttgenbach & Co., 44,481 tons; Dunnellon Phosphate Company, 38,237 tons, and J. Hull & Co., 23,455 tons (for June and July).

A charter has recently been taken from Tampa to Stettin, Germany, at 16s. 9d. ($4.02), this month's sailing.

The shipments of Algerian phosphates this year, particularly to Germany, Italy and Great Britain, are rather large, as shown below, in metric tons:

Companies shipping—	July.	Seven months.
Constantine	9,570	108,090
Dyr	7,930	45,466
Societe Francaise	1,802	13,727
Total	19,302	167,283

At this rate the year's shipments will likely show a substantial increase over 1902.

Phosphates.	Per ton. F. o. b.	United Kingdom or European ports. Unit.	Long ton.
*Fla. hard rock (77@80%)	$7.00@$7.50	6¾@7⅝d.	$10.53@11.70
*Fla. land peb. (68@73%)	3.50@ 3.75	5½@5¾d.	7.70@ 8.05
†Tenn. (78@82%) export	4.00@ 4.25	6½@7d.	10.40@ 8.05
†Tenn. 78% domestic	3.75@ 4.00	.....	.....
†Tenn., 75% domestic	3.50	.....	.....
†Tenn., 73@74% domestic	2.95@ 3.20	.....	.....
†Tenn., 70@72% domestic	2.70@ 2.95	.....	.....
‡So. Car. land rock	...@ 3.25	.....	.....
‡So. Car. riv. r'k (55@60%)	2.75@ 3.00	4⅝@5½d.	5.55@ 6.60
Algerian (63@70%)	.....	5¼@6¼d.	7.37@ 8.38
Algerian (58@63%)	.....	4⅝@5¾d.	5.55@ 6.90
Gafsa (Tunis)	.....	5¼@6d.	6.30@ 7.20
Christmas Isl. (80@85%)	.....	7½@8¼d.	12.38@13.61

*Fernandina, Tampa, Brunswick, Savannah or Port Inglis.
†Mt. Pleasant. ‡On vessels, Ashley River.

METAL MARKET.

New York, Sept. 9.

Gold and Silver Exports and Imports,

At all United States Ports in July and Year.

Metal	July. 1902.	July. 1903.	Year. 1902.	Year. 1903.
Gold:				
Exports	$7,884,339	$9,117,758	$28,100,576	$40,453,999
Imports	1,594,421	4,631,217	14,781,765	18,607,271
Excess	E. $6,289 918	E. $4,486,541	E.$13,378,811	E. 21,846,728
Silver:				
Exports	$3,671,814	$3,015,426	$26,199,848	$20,520,765
Imports	2,276,480	2,564,217	14,497.218	12,545,511
Excess	E. $1,395,334	E. $451,209	E.$11,702,630	$7,975,254

These exports and imports cover the totals from all United States ports. The figures are furnished by the Bureau of Statistics of the Treasury Department.

Gold and Silver Exports and Imports, New York.

For the week ending September 9, and for the years from January 1:

Period.	Gold. Exports.	Gold. Imports.	Silver. Exports.	Silver. Imports.	Total Excess, Exports or Imports.
Week..	$4,250	$9,465	$633,315	$744	E. $627,356
1903....	32,198 957	3,727,840	14.486,520	1,690,461	E. 41,267,176
1902....	24,519,808	1,670,079	17,364,144	881,072	E. 39,331,803
1901....	25,806.269	2,208,574	22,601,811	2,704,070	E. 43,492,436

The heavy exports of silver were to London and some to Havre. Imports were correspondingly light.

Business generally continues good, though the speculative markets are still somewhat uneasy. Crop prospects are unchanged by recent advices.

The statement of the New York banks, including the 56 banks represented in the Clearing House, for the week ending September 5, gives the following totals, comparisons being made with the corresponding weeks of 1902 and 1901:

	1901.	1902.	1903.
Loans and discounts	$885,145,800	$906,374,800	$924,415,800
Deposits	947,692,100	923,398,200	918,131,300
Circulation	30,668,400	33,565,000	43,871,400
Specie	170,135,100	161,593,800	172,736,000
Legal tenders	73,703,800	73,352,800	74,093,800
Total reserve	$243,838,900	$234,946,600	$246,829,800
Legal requirements	236,923,025	230,849,500	229,532,825
Balance surplus	$6,915,875	$4,097,100	$17,296,975

Changes for the week this year were an increase of $1,304,300 in loans and discounts, and decreases of $1,992,600 in deposits, $47,000 in circulation, $2,261,900 in specie, $1,617,200 in legal tenders and $3,380,950 in surplus reserve.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars and comparisons made with the holdings at the corresponding date last year:

	1902. Gold.	1902. Silver.	1903. Gold.	1903. Silver.
N. Y. Assoc.	$161,593,800	....	$172,736,000	....
England	188,170,745	....	177,505,870	....
France	523,102,210	$224,572,785	510,803,425	$224,632,555
Germany	179,020,000	66,215,000	176,505,000	62,015,000
Spain	71,195,000	98,190,000	73,160,000	101,240,000
Netherlands	23,708,500	33,058,500	19,712,500	32,455,000
Belgium	15,660,000	7,830,000	14,520,000	7,260,000
Italy	80,525,000	10,426,000	95,940,000	11,470,000
Russia	371,375,000	44,360,000	412,215,000	43,490,000
Austria	226,075,000	62,555,000	227,375,000	63,810,000

The returns of the Associated Banks of New York are of date September 5 and the others September 3, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

The silver market weakened early in the week, owing to the temporary withdrawal of India, but with renewals of orders from that quarter the price to-day is firm, with a prospect of an advance.

The United States Assay Office in New York reports receipts of 46,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to August 27 are reported by Messrs. Pixley & Abell's circular as follows:

	1902.	1903.	Changes.
India	£4,208,060	£3,950,975	D. £257,085
China	135,850	294,186	I. 158,336
Straits	155,820	696,879	I. 541,059
Total	£4,499,730	£4,942,040	I. £542,310

Receipts for the week this year were £154,200 in bar silver from New York, £5,868 from South America, £44,190 from Australia and £1,109 from the West Indies; total, £205,367. Shipments were £214,500 in bar silver to Bombay, and £365 to Port Said; total, £214,865.

Indian exchange has been well maintained, Council bills selling in London at 16d. per rupee. There have been considerable shipments of gold from Australia to India. The demand for silver for India and China continues fair.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars	$0.44	$0.46
Peruvian soles and Chinese pesos	.40	.44
Victoria sovereigns	4.86	4.88
Twenty francs	3.88	4.88
Spanish 25 pesetas	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

September	Silver—Sterling Exchange.	Silver—N. Y. Cts.	Silver—London Pence.	Copper—Lake, Cts. per lb.	Copper—Electrolytic, Cts. per lb.	Copper—London, £ per ton.	Tin, Cts. per lb.	Lead, Cts. per lb.	Spelter—N. Y., Cts. per lb.	Spelter—St. Louis, Cts. per lb.
3	4.86	57⅜	26½	13¾ @13⅝	13¼ @13½	58¼	27⅛	4.05 @4.10	5.70 @5.75	5.52½ @5.57½
4	4.86¼	56⅞	26 5/16	13⅝ @13⅝	13¼ @13¼	58	27⅛	4.05 @4.10	5.70 @5.75	5.52½ @5.57½
5	4.86¼	57	26 5/16	13⅝ @13⅝	13¼ @13½	....	27	4.05 @4.10	5.70 @5.75	5.52½ @5.57½
7	.....	.....	26 5/16	.....	.....	58⅜	....	.....	.....	.....
8	4.86¼	56⅞	26¼	13⅝ @13⅝	13¼ @13¼	58¼	27	4.05 @4.10	5.70 @5.75	5.52½ @5.57½
9	4.86⅜	57¼	26⅜	13¾ @13⅝	13¼ @13½	58	27	4.05 @4.10	5.70 @5.75	5.52½ @5.57½

London quotations are per long ton (2,240 lbs.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wirebars: the price of electrolytic cathodes is usually 0.25c. lower than these figures.

Copper.—During the week under review the market has had more or less of a holiday aspect, and nothing of interest transpired, the business transacted not assuming large proportions. The ruling quotations are 13⅜@13⅝ for Lake copper, 13¼@13½ for electrolytic copper in cakes, wirebars and ingots; 13@13¼ in cathodes; 12⅝@12⅞ for casting copper.

The market for standard copper in London, which closed last week at £58, opened on Monday at £58 2s. 6d., and the closing quotations on Wednesday are cabled as £57 17s. 6d.@£58 for spot, £57 5s.@£57 7s. 6d. for three months.

Refined and manufactured sorts we quote: English tough, £62 10s.@£63; best selected, £63@£63 10s.; strong sheets, £71@£72; India sheets, £68@£69; yellow metal, 6⅜@6½d.

Exports and imports of copper at New York, Philadelphia and Baltimore, in the week of September 8, and for the year to date, were in long tons:

	Week.	Year.
Austria	330	3,952
Belgium	15	1,017
France	...	13,431
Germany	907	17,646
Holland	878	26,317
Italy	50	1,916
United Kingdom	130	11,498
Other countries	153	3,983
Total copper	2,463	79,760
Matte	...	286
Imports—		
Copper	727	18,759
Matte	...	984
Ore	2,785	29,462

Exports have been smaller than last week, but imports show an increase. Of the imports Japan furnished 275 tons copper; the ore came from Tilt Cove.

Tin.—In spite of some efforts to maintain values, the market has been very flat indeed, consumers confining their purchases to early deliveries. While at the end of last week 27¼ was paid, prices have again receded, and the closing quotations are given as 26⅞@27c. for spot, 26⅝@26¾c. for September, 26⅝@26½c. for October.

The foreign market, which last week closed at £123 7s. 6d., opened on Monday at £121 15s., advanced on Tuesday to £122 10s., and the closing quotations on Wednesday are cabled at £122@£122 2s. 6d. for spot, £121@£121 2s. 6d. for three months.

Lead is very firm indeed, spot being rather scarce. The ruling quotations are 4@4.02½ St. Louis, 4.05@4.10 New York.

The foreign market is somewhat firmer, Spanish lead being quoted at £11 6s. 3d., English lead at £11 8s. 9d.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Spot lead is very scarce and slightly advancing. Sales have been made on a basis of 4.30c., East St. Louis.

Spanish Lead Market.—Messrs. Barrington & Holt report from Cartagena, Spain, under date of August 22, that the price of silver during the week has been 14 reales per oz. Exchange remains unaltered at 34.45 pesetas to £1. Local quotation for pig lead on wharf has been 62.25 reales per quintal, which, on current exchange, is equal to £10 2s. 4d. per ton of 2.240 lb., f. o. b. Cartagena. Exports for the week were 1,153 kgs. pig lead and 70,000 kgs. desilverized, all to Marseilles.

Spelter is quiet but steady, spot being rather scarce and commanding a premium. The ruling quotations are 5.52½@5.57½ St. Louis, 5.70@5.75 New York.

The foreign market is firm, good ordinaries being quoted at £21 2s. 6d., specials at £21 7s. 6d.

St. Louis Spelter Market.—The John Wahl Commission Company telegraphs us as follows: Spelter is firm, but quiet. Spot metal is selling at 5.65c., East St. Louis, while futures are nominal at 5.60c.

Spanish Zinc Ore Market.—Messrs. Barrington & Holt write from Cartagena, Spain, under date of August 22, that the exports for the week were 200 tons of calamine to Hamburg and 1,100 tons blende to Antwerp. There are large stocks of high-class ore at some of the principal mines, but the owners refuse to sell at present low prices, preferring to hold their stocks in the hope that spelter will recover and prices of ore will then rise. Miners who cannot afford the stock are selling at current prices, but very little of the ore sold reaches 36 per cent zinc.

Antimony is quiet but steady. We quote Cookson's at 7@7¼c.; Hallett's, 6⅞@6½c.; U. S., 6@6¼c.; Italian and French at 6@6½c.; Japanese, 5¾@5⅞c.

Nickel.—The price is quoted by leading producers at 40@47c. per lb. for large quantities down to ton lots, according to size and terms of order. The price for smaller lots, according to quantity, runs as high as 60c. per lb.

Platinum.—Consumption continues good, and prices are firm. Ingot platinum in large lots brings $19 per oz. in New York.

Quicksilver.—The New York price is unchanged at $47.50 per flask for large lots, with a slightly higher figure quoted for small orders. The San Francisco quotations are still $44.50@$46 per flask for domestic orders and $42@$43 for export. The London price is £8 10s. per flask, with the same quotation asked by second hands.

Minor Metals and Alloys.—Wholesale prices, f. o. b. works, are as follows:

Aluminum	Per lb.
No. 1. 99% ingots	33@37c.
No. 2. 98% ingots	31@34c.
Rolled Sheets	4c. up
Alum-bronze	20@22c.
Nickel-alum	34@39c.
Bismuth	$2.10
Chromium, pure (N. Y.)	80c.
Copper, red oxide	50c.
Ferro-Molybde'm (50%)	$1.25
Ferro-Titanium (10)	90c.
Ferro-Titanium (20@25% N. Y.)	55c.
Ferro-Tungsten (37%)	36c.
Magnesium, pure (N. Y.)	60c.
Magnesium	$2.75
Mangan'e Cop. (20% Mn)	32c.
Mangan'e Cop. (30% Mn)	38c.
Molybdenum (Best)	$1.82
Phosphorus, foreign	45c.
Phosphorus, American	70c.
Sodium metal	50c.
Tungsten (Best)	62c.

Variations in price depend largely upon the size of orders.

Missouri Zinc Ore Markets. Sept. 5.

(From Our Special Correspondent.)

The highest price for zinc ore during the week was $40, the same as for several weeks, and the assay price remains unchanged at $35@$37 per ton of concentrates assaying 60 per cent zinc. Lead maintained the advance of last week, selling at $54 per ton. A year ago lead brought only $49 and zinc $39.50 for choicest lots. The powder situation is in no manner alarming. President George Braun, of the La Harpe Spelter Company, purchased four car-loads of zinc ore at Galena this week to start the first block of this company's new smelter at La Harpe, Kansas, next week. A second block is to be started in ten days and a third in 30 days. This new source of demand, coupled with the resumption of smelting on blocks that have been on dead fire at two other smelters, will tax this district to supply the ore, unless the western situation becomes more settled, so that larger supplies of zinc can be obtained from that territory. Producers are looking for a more spirited competition for ore by the first of October.

Following are the shipments of zinc and lead concentrates from the various camps of the Joplin district for the week ending to-day, and the year's totals to this date:

	Zinc, lbs.	Lead, lbs.	Total value.
Joplin	2,596,450	191,120	$54,495
Carterville-Webb City	2,166,340	430,170	50,500
Aurora	1,210,170	10,010	21,165
Galena-Empire	939,320	66,920	18,250
Duenweg	673,330	105,310	15,270
Zincite	369,180	....	6,830
Alba-Neck	365,120	....	6,755
Prosperity	351,570	8,060	6,720
Oronogo	303,930	5,480	5,170
Granby	240,000	40,000	3,500
Stotts City	180,100	....	3,250
Spurgeon-Spring City	141,320	28,620	3,165
Carl Junction	167,120	....	3,090
Carthage	171,860	....	2,925
Badger	130,500	5,600	2,600
Central City	74,720	6,670	1,410
Cave Springs	62,020	8,860	1,355
Diamond	62,320	....	1,140
Ash Grove	....	35,500	940
District totals	10,206,370	942,320	$208,530
Thirty-six weeks	340,934,810	39,768,930	$6,932,655
Zinc value, the week	$183,225;	36 weeks	$5,861,130
Lead value, the week	25,305;	36 weeks	1,071,525

Compared with last week the shipment was an increase of 305 tons of zinc, a decrease of 85 tons of lead ,and an increase in value of $5,360. Compared with the same week of last year the shipment is an increase of 537 tons of zinc, a decrease of 383 tons of lead, and an increase in value of $21,473. For the 36 weeks of this year the shipments of zinc have been 16,182 tons less, and of lead 2,025 tons less, yet the value of this year exceeds that of last year by 372,126.

Average Prices of Metals per lb., New York.

Month.	Tin. 1903.	Tin. 1902.	Lead. 1903.	Lead. 1902.	Spelter. 1903.	Spelter. 1902.
January	28.33	23.54	4.075	4.000	4.885	4.27
February	29.43	24.07	4.075	4.075	5.043	4.15
March	30.15	26.32	4.442	4.075	5.349	4.28
April	29.81	27.77	4.561	4.075	5.550	4.37
May	29.51	29.85	4.325	4.075	5.639	4.47
June	28.34	29.36	4.210	4.075	5.697	4.96
July	27.68	28.38	4.075	4.075	5.662	5.27
August	28.29	28.23	4.075	4.075	5.725	5.44
September	.....	26.60	.....	4.075	.....	5.49
October	.....	26.07	.....	4.075	.....	5.38
November	.....	25.68	.....	4.075	.....	5.18
December	.....	25.68	.....	4.075	.....	4.78
Year	.....	26.79	.....	4.069	.....	4.84

NOTE.—The average price of spelter in St. Louis for the month of January, 1903, was 4.689c. per lb.; for February, 4.681c.; for March, 5.174c.; for April, 5.375c.; for May, 5.469c.; for June, 5.537c.; for July, 5.507c; August, 5.55c.

Average Prices of Copper.

Month.	New York. Electrolytic. 1903.	New York. Electrolytic. 1902.	New York. Lake. 1903.	New York. Lake. 1902.	London. Standard. 1903.	London. Standard. 1902.
January	12.159	11.053	12.361	11.322	53.52	48.43
February	12.778	12.173	12.901	12.378	57.34	55.16
March	14.416	11.882	14.572	12.188	63 85	53.39
April	14.454	11.618	14.642	11.986	61.72	52.79
May	14.435	11.856	14.618	12.226	61.73	54.03
June	13.942	12.110	14.212	12.360	57.30	53.93
July	13.0 4	11.771	13.341	11.923	56.64	52.89
August	12.962	11.404	13.159	11.649	58.44	51.96
September	.....	11.480	.....	11.760	.....	52.68
October	.....	11.449	.....	11.722	.....	52.18
November	.....	11.288	.....	11.553	.....	51.08
December	.....	11.430	.....	11.599	.....	50.95
Year	.....	11.626	.....	11.887	.....	52.46

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

Average Prices of Silver, per ounce Troy.

Month.	1903. London Pence.	1903. N. Y., Cents.	1902. London. Pence.	1902. N. Y., Cents.	1901. London, Pence.	1901. N. Y., Cents.
January	21.98	45.57	25.62	55·56	28.97	62.82
February	22.11	47.89	25.41	55·09	28.13	61.06
March	22.49	48.72	25.00	54.23	27.04	60.23
April	23.38	50.56	24.34	52.72	27.30	59.29
May	24.89	54.11	23.71	51.31	27.43	59.64
June	24.29	52.86	24.17	52.36	27.42	59.57
July	24.86	53.92	24.38	52.88	26.96	58.46
August	25.63	55.36	24.23	52.52	26.94	58.37
September	.....	.....	23.88	51.52	26.95	58.26
October	.....	.....	23.40	50.57	26.62	57.59
November	.....	.....	22.70	49.07	26.12	56.64
December	.....	.....	22.21	48.03	25.46	55.10
Year	.....	.....	24.09	52.16	27.11	58.95

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

DIVIDENDS.

Name of Company.	Date.	Per Share.	Total.	Total to Date.
Bunker Hill & Sull	Sept. 4	.09	18,000	1,442,000
Calumet & Hecla	Sept. 24	10.00	$1,000,000	$82,351,000
*Central Lead, Mo.	Sept. 15	.50	5,000	370,000
C. K. & W., Colo.	Sept. 7	.01	14,319	85,914
Con. Mercur, Utah	Sept. 10	.03	30.000	1,030,000
*Daly West, Utah	Sept. 15	.65	117,000	3,240,000
*Empire-State, Ida	Sept. 15	.05	25,277	1,789,155
*Four Oil, Cal.	Sept. 15	.01	2,087	43,827
†National Lead, pf.	Sept. 15	1.75	260,820	13,709,348
†Republic Iron & Steel, pf.	Oct. 1	1.75	358,345	6,053,476
*Sacramento, Utah	Sept. 1	.00½	5,000	178,000
†Standard Con., Cal.	Sept. 24	.10	17,839	4,160,331
Standard Oil	Sept. 15	5.00	4,850,000	195,075,000
Wolverine, Mich.	Oct. 1	3.00	180,000	1,230,600

*Monthly. †Quarterly.

ASSESSMENTS.

Name of Company.	Location.	No.	Delinq.	Sale.	Amt.
Albion	Utah	..	Sept. 23	Oct. 10	.04
Annandale	Utah	..	Sept. 15	Oct. 10	.00½
Bullion	Nev.	..	Sept. 23	Oct. 14	.05
Challenge Con.	Nev.	..	Sept. 15	Oct. 6	.10
Chollar	Nev.	..	Sept. 17	Oct. 8	.10
Con. Cal. & Va.	Nev.	..	Aug. 28	Sept. 18	.25
Daylight	Utah	..	Aug. 28	Sept. 30	.01
East Sierra & Nevada	Nev.	..	Sept. 23	....	.05
Emerald	Utah	..	Sept. 15	Oct. 10	.00½
Grizzly	Cal.	..	Sept. 21	....	.10
Hale & Norcross	Nev.	..	Aug. 31	Sept. 30	.10
Little Chief	Utah	17	Sept. 18	Oct. 9	.01
Mexican	Nev.	..	Sept. 24	Oct. 15	.10
Ophir	Nev.	..	Sept. 15	Oct. 5	.15
Potosi	Nev.	67	Sept. 14	Oct. 6	.10
Sunrise	Utah	..	Sept. 14	Oct. 5	.01
Silver Coin	Utah	..	Oct. 1	Oct. 8	.01
Swansea	Utah	..	Sept. 21	Oct. 8	.15
Union Con.	Nev.	..	Sept. 23	Oct. 12	.10
Wabash	Utah	4	Sept. 9	Oct. 5	.05

STOCK QUOTATIONS

NEW YORK.

Company and Location.	Par val	Shares Listed.	Sept. 2 H.	Sept. 2 L.	Sept. 3 H.	Sept. 3 L.	Sept. 4 H.	Sept. 4 L.	*Sept. 5 H.	*Sept. 5 L.	*Sept. 7 H.	*Sept. 7 L.	Sept. 8 H.	Sept. 8 L.	Sales.
Adams- Colo.	10	150,000					15								500
Alta. Nev.	1		05												1,000
Amalgamated c., Mont	100	1,538,879	49⅛	48	48¾	47⅞	48⅝	47⅝			49	48			56,075
Anaconda c., Mont.	15	1,200,000	80¼	80	81½	80½	81								1,700
Anaconda Gold, Colo.	1	1,000,000					13½								500
Andes Nev.	1	100,000			.16	.15									900
Best & Belcher, Nev.	3	100,000			1.50										100
Brunswick, Cal.	25		.04	03½			04½	04			04				105,000
Caledonia, Nev.	1														
Chollar, Nev.	2½		12				10	09							1,500
Con.Cal.&Va.,g.s.,Nev	100	112,000	1.45				1.30								350
Cons. Imperial, Colo.	2½	216,000	05		05½	05									2,000
Crown Point, Nev.	1	500,000			10										200
Daly. Utah.	1														
Doctor Jack Pot, Colo	1	2,900,000									10				1,000
Dunkin, Col	20				10	08									500
Elkton, g., Colo.	1		40		40						41	40			800
Gold Dollar, Colo.	1				04½										500
Golden Age, Colo.	1	1,000,000									01				1,000
Golden Fleece, Colo.	1						10								500
Greene Con., c., Mex.	15	720,000	19⅛	18¾	19⅛	19	19				19⅜	19¼			2,575
Hale & Norcross, Nev	3				58		48	47							400
Horn Silver, Utah.	21	400,000	1.15	1.10											200
Iron Silver Colo.	20		1.40												50
Isabella, g., Colo.	1	2,500,000	15½	15							16	15			3,100
Leadville Colo.	20				04										500
Little Chief, Colo.	1				06½	06	03				06				1,600
Mexican, Nev.	3	100,800			1.00						1.00				400
Mollie Gibson, Colo.	5	5,000,000	06												1,200
Ontario, Utah.	3	1,000,000	5.50	5.25	5.50										450
Ophir, Nev.	100	150,000	1.60								1.65				350
Pharmacist, Colo.	1	100,800													
Portland, Colo.	1				1.30						1.25				500
Potosi, Nev.	10	3,000,000	11				11				13	12			2,300
Savage, Nev.	3	112,000					20								300
Small Hopes Colo.	2½	112,000	31	30			31								800
Silver Hill, Nev	20	250,000													
Standard, Cal.	1	180,000					2.25				2.50				275
Tenn., c., Tenn.	10						29								130
Union Con., Nev.	25	175,000					60				60				400
Union Cop., N. C.	2½	10¹,000	1¼	1⅛	1¼		1¼						1⅛		2,300
Uni'd Cop. com.,Mont	10	300,000	15⅞		15⅞		15⅞						15⅞		400
White Knob, g. s., Ind.	100	450,000			10½										100
Work, Colo.	1				06½										2,000
Yellow Jacket, Nev.	3	120,000					49								100

Total sales 100,055 shares. † Ex-Dividend. ᵛStock Exchange Closed. *Holiday.

COLORADO SPRINGS (By Telegraph).

Name of Company.	*Sept. 7 H.	*Sept. 7 L.	Sept. 8. H.	Sept. 8. L.	Name of Company.	*Sept. 7. H.	*Sept. 7. L.	Sept. 1. H.	Sept. 1. L.
Acacia			.06¾	.05⅞	Isabella			.13¾	.12
Am. Con.			.02½	.01¾	Jack Pot.				
Anaconda			.12½	.11½	Keystone.			.04	.03¾
Blue Bell.			.05	.03	Last Dollar.				
Cripple Creek Con.			.04	.03¾	Lexington.			.03¾	.03½
C. K. & N.			.19	.17¾	Little Puck.			.03	.02½
Doctor Jack Pot			.09¼	.06¾	Mollie Gibson.				
Elkton Con			.45	.42	Moon Anchor.			.10	.09½
El Paso.			.61	.60½	Old Gold.				
Findley			.14	.13½	Pharmacist			.03½	.03¼
Gold Dollar Con.			.04½	.04⅜	Pinnacle.			.03	.02
Golden Cycle.					Portland.			1.25	1.19
Golden Fleece.			.15	.07	Vindicator.				
Gould			.02½	.02⅜	Work			.05¼	.05

*Holiday.

COLORADO SPRINGS, COLO.*

Name of Company.	Par Val	Shares Listed.	Aug. 29 H.	Aug. 29 L.	Aug. 31 H.	Aug. 31 L.	Sept. 1 H.	Sept. 1 L.	Sept. 2 H.	Sept. 2 L.	Sept. 3 H.	Sept. 3 L.	Sept. 4 H.	Sept. 4 L.	Sales
Acacia	$1	1,500,000	.05⅞	.05½	.06	.05¾	06½	.05¾	.06	.06½	.06¼	.05¾	.06¼	.05⅝	3,000
Am. Con.	1	2,000,000	.02½		.02½		.02⅝		.02½		.02		.02¼		
Anaconda	5	1,000,000	.11½	.10½	.11½	.10⅝	.10	.10¾	.10⅝		.12	.11¼	.12	.11⅛	1,500
Ben Hur.	1	900,000	.02½		.01½		.01		.02¼	.02	.02		.02½		2,000
Blue Bell.	1	1,000,000	.04		.04		.05½		.05		.03½		.03		
C. C. & M.	1	1,000,000	.02¼	.02¼	.02¼	.02½	.02¼	.02⅜	.02¼	.02½	.02¼	.02½	.02¼	.02⅜	
C. K. & N.	1	1,250,000	.10	.17	.18⅜	.17	.18⅜	.18	.16		.17½	.17⅜	.17	.16	16,000
C. C. Con.	1	2,000,000	.04½	.03½	.04½	.04	.05	.04			.05	.04	.04½	.03⅜	3,500
Coriolanus.	1	1,500,000	.02		.02		.02		.02		.02	.01½	.02	.01⅜	
Des Moines.	1	750,000	.02¼		.02		.02½		.02½		.02¼		.02¼		
Dr. Jack Pot.	1		.09	.08	.08⅝	.08⅜	.08⅜	.08	.08⅜	.08	.08⅜	.08¼	.09	.08½	10,000
Elkton Con.	1	1,250,000	.43	.40	.43	.41	.43	.41⅛	.43	.41¼	.43	.41¼	.45	.42	400
El Paso.	1	900,000	.60	.59¾	.61	.60	.61	.60	.61	.59¾	.61	.60	.61	.59¾	2,800
Fannie Rawlings.	1	1,000,000	.03	.02½	.03	.02¼	.03	.02⅜	.03	.02⅛	.03	.02½	.03	.02⅛	6,000
Findley.	1	1,250,000	.14	.13½	.14	.13½	.14¼	.13½	.14	.13½	.14	.13½	.14¼	.13½	
Gold Bond.	1	1,000,000	.02		.02		.02		.02		.02				
Gold Dollar Con.	1		.04¾	.04½	.04⅜	.04¼	.04⅝	.04¼	.04¼	.04⅜	.04⅝	.04½	.04½	.04¼	27,000
Golden Cycle.	1	2,000,000	.70	.65	.67	.65¼	.67	.66	.67	.65	.67	.65	.67	.65¼	
Golden Fleece.	1	600,000	.12	.06	.12	.06	.12	.06	.12	.06	.12	.06	.12	.06	
Gould	1	1,250,000	.02	.01¾	.02	.01¾	.04	.02	.02½	.02½	.02½	.02¼	.02¼	.02⅛	17,000
Hart.	1	1,000,000	.03	.02½	.02		.02		.02		.02		.02		
Isabella	1	2,500,000	.11¾	.11½	.12	.11⅝	.12	.11¾	.11⅝	.11¼	.12½	.11⅜	.13	.12	16,000
Jack Pot.	1	1,250,000	.05		.05¼		.05½		.10	.05½	.05		.09	.05	
Last Dollar.	1	1,500,000	.50		.50		.50		.50		.50		.50		
Lexington.	1	1,500,000	.03½	.03⅜	.03½	.03⅜	.03½		.03¾	.03½	.04	.03½	.04	.03½	
Little Puck.	1	2,000,000	.03	.02	.03	.02	.03	.02	.03	.02	.03	.02	.03	.02	
Mollie Gibson	5	1,000,000	.05½		.05½		.05⅝		.05¼		.05¼		.05½		
Moon-Anchor.	1	600,000	.09½	.09	.10	.09	.09		.10	.09¼	.10	.09¼	.10	.09⅜	500
New Haven.	1	1,500,000	.02½	.02¼	.02½	.02⅜	.03¼	.02⅜	.03	.02½	.03	.02½	.03	.02⅜	1,000
Pharmacist, Con.	1	1,500,000	.03½	.03¼	.03¼	.03½	.03½	.03	.03⅜	.03	.03⅜	.03	.03¼	.03⅛	4,000
Pinnacle	1	2,000,000	.03⅜		.03¼		.03¼		.03¼		.03½		.03		
Pointer.	1	1,250,000	.009		.01¼	.009	.01½	.009	.01¼	.01	.01¾	.01	.01		500
Portland	1	3,000,000	1.24	120½	1.25	120½	1.40	1.20	1.30	1.20	1.25	1.20	1.25	1.20	
Prince Albert.	1	3,000,000	.02	.01¾	.02	.01¾	.01¾		.01¾		.02¼	.01¾	.01¾		
Vindicator	1	1,500,000	.85	.60	.90		.90		.80		.90	.40	.90	.40	
Work	1	1,500,000	.06½	.05¼	.05⅝	.05½	.05¼	.05	.05¼	.05	.05¼	.05½	.05¼	.05½	4,000

*Colo. Springs Mining Stock Exchange. All mines are in Colorado. Total sales 115,200 shares.

SAN FRANCISCO (By Telegraph).

Name of Company.	Shares Issued.	September *7.	September o8.	Name of Company.	Shares Issued.	September *7.	September o8.
Belcher	104,000			Justice	105,000		
Best & Belcher.	100,800			Mexican.	100,800		
Caledonia.	100,000			Occidental Con	100,000		
Challenge Con.	50,000			Ophir.	100,800		
Chollar.	112,000			Overman.	115,200		
Confidence.	24,960			Potosi.	112,000		
Con. Cal. & Va.	216,000			Savage.	112,000		
Con. Imperial.	500,000			Sierra Nevada.	100,000		
Crown Point.	100,000			Union Con.	100,000		
Gould & Curry.	108,000			Utah Con.	100,000		
Hale & Norcross.	112,000			Yellow Jacket.	120,000		

oNo Quotations Reported. *Holiday.

COAL, IRON AND INDUSTRIAL STOCKS.*

Name of Company.	Par val.	Shares Issued.	Sept. 2 H.	Sept. 2 L.	Sept. 3 H.	Sept. 3 L.	Sept. 4 H.	Sept. 4 L.	oSept. 5 H.	oSept. 5 L.	*Sept. 7 H.	*Sept. 7 L.	Sept. 8 H.	Sept. 8 L.	Sales
Allis-Chalmers, U. S.	$100														
Allis-Cham's, pf, U. S.	100	200,000													
Am. Agr. Chem., U. S.	100														
Am.Agr.Chem.pf,U.S.	100	181,350			79										500
Am. Sm. & Ref., U. S.	100	500,000	44½	44	44	43⅞	44⅜	43⅞					44¼	43½	5,700
Am.Sm. & Ref.,pf,U.S.	100	500,000	90⅝	90	90	90	90⅝	90					90⅜	90¼	1,085
Am. Steel & Fdy.,U.S.	100														
Am. S. & Fdy., U. S.	100	155,000													
Col. Fuel & I., Colo.			51⅜	51	47¾	44	44½	44¼					43½	42⅞	5,180
Col. & H. C. & I., Colo.	100	69,244	15½	14¾											275
†Crucible Steel, U. S.	100	250,000	10½	10½	10½	10	10						10¼		400
†CrucibleSteel,pf,U.S.	100	250,000	70⅜	70⅝	71		71						71¼	71	247
†Mong. R. Coal, Pa.	50	200,000			38		11½	11					12⅜	12	1,500
†Mong. R. Coal, pf, Pa.	50	98,300					39¾						40½	40	220
National Lead, U. S.	100	149,054			15		15								320
National Lead, pf,U.S.	100	149,040					84¾								100
†Phila. Nat. Gas.	100	308,542			39¾								40⅜	40	75
†Phila. Nat. Gas, pf.	100	212,873			44										85
†Pittsburg Coal, Pa.	100	300,307	33⅞	33½	34	32⅝	36	34					35	34½	9,222
†Pittsburg Coal,pf,Pa.	100	297,012	85	84	83⅞	83½	83½	82⅜					83½	83	398
Republic I. & S., U. S.	100	273,520	11¾		11⅜	11¼	11⅜						11⅜	11	600
Republic I.&S.,pf,U.S.	100	203,569	66⅞	62½	66¾		67								695
Sloss-Shef S. & I., Ala.	100	75,000	34½												100
Sloss-ShefS.&I.pf,Ala.	100	65,085													
Standard Oil, U. S.	100	970,000			612		618	610							51
Tenn. C.I. & R.R.	100	225,000	42¼	42	42		42½	41⅜					42¾	41¼	4,635
U.S. Red. & Ref., U. S.	100	59,188													
U.S.Red&Ref.,pf, U.S.	100	39,485													
U.S. Steel Corp., U. S.	100	5,084,952	23½	22¾	22¼	22⅛	23⅛	22⅛					23⅜	23	26,797
U.S. SteelCrop.pf,U.S.	100	5,103,141	70⅝	70⅜	71⅛	70¾	71¼	70⅝					71⅜	70½	13,610
Va.-Car Chem., U. S.	100	279,844	23½		23⅛	23	23½	23⅛					23⅝	23⅛	1,100
Va.-Car Chem.,pf,U.S.	100	120,000	95										95		300
Va. I., Coal & Coke	100	86,416													

oStock Exchange. closed *Holid.y ‡Ex-dividend. Total sales 73,195 shares.

BOSTON, MASS.*

Name of Company.	Par val	Shares listed	Sept. 2 H.	Sept. 2 L.	Sept. 3 H.	Sept. 3 L.	Sept. 4 H.	Sept. 4 L.	oSept. 5 H.	oSept. 5 L.	*Sept. 7 H.	*Sept. 7 L.	Sept. 8 H.	Sept. 8 L.	Sales.
Adventure Con., c.	$25	100,000	6		6	5⅞	5⅞	5½					6		392
Allouez.	25	99,511	5½		5¼										35
Amalgamated, c.	100	1,538,879	49	48	48⅜	47⅞	48½	47¾					49	47⅝	8,361
Am. Gold Dredging.	5	90,000													
Am. Z. L. & Sm.	25	60,000			8										100
Anaconda	25	1,200,000													
Arcadian, c.	25	150,000			1½		1½						1¾		180
Arnold	25	60,000													
Atlantic, c.	25	100,000					9	8½							50
Bingham Con., g. s.	50	150,000	26		26¼	26	25¾						25½		1,150
Bonanza.	10	300,000													
British Columbia.	5	256,500													
Cal. & Helca, c.	25	100,000	470				470						470		13
Centennial, c.	25	90,000	20¾	20½	20½	20	20						20		770
Central Oil.	25	60,050											8		30
Con. Mercur, g.	5	1,000,000	1¼		1¼		1⅛	1⅛							845
Copper Range Con.	100	285,000	66	64½	65½	64½	65¼	64					66¾	65	50,704
†Daly-West.	20	180,000	40¼	40	40		40½	40					41		715
Dominion Coal.	100	150,000	85½	83½	83	82½	83	82¾					80	80	1,540
Dominion Coal, pf.	100	30,000	08												20
Dominion I. & S.	100	100,000			9¾	9¼	12	9¾					14½	12¼	5,875
Elm River.	12	100,000													
Franklin, c.	25	100,000													
Granby Con.	10	1,336,303													
Guanajuato Con.	5	385,000													
Isle Royal Con., c.	25	385,000											7¼		50
Mass Con., C.	25	100,000											5½		15
Mayflower, c.	25	100,000	1										1⅜		400
Michigan, c.	25	100,000	8½		8½	8¼	8								100
Mohawk, c.	25	100,000	43¾	42	42¾	42	42						43	42	553
Mont. Coal & Coke.	25	200,000											4	3½	350
Mont'l & Boston, c.	5	570,000					92½								100
New Idria.	5	100,000													
Nova Scotia St. & C.	100	37,623													
Nova Scotia St.&C., pf.	100	16,300													
Old Colony, c.	25	100,000													
Old Dominion, c.	25	150,000	10¾	9¼			10½	10					10	9¼	783
Osceola, c.	25	96,150	61	60	60¾	60	59⅜						60	59¾	342
Parrott, s. c.	10	229,850			21½	20	20½								370
Phœnix Con, c.	25	100,000	5				5⅛	5¼					5⅛		70
Quincy, c.	25	100,000			90		89						89		96
Rhode Island, c.	25	100,000													
Santa Fe, g. c.	10	250,000													
Shannon, c.	10	188,153	10		10⅛		10⅜	10¼					10		513
Tamarack, c.	25	60,000	113	100											100
Tecumseh.	25	80,000													
Tennessee.	25	160,000													
Trimountain.	100	450,000	77	70			73								1,186
Trinity, c.	25	419,000	7½	7⅛	7½	7¼	7½						7½	7¼	1,325
United c.	25	240,000													
United States, g.	10	300,000	20½	19⅞	20⅛	19⅞	20⅛	20					20⅛	20	1,335
U. S. Coal & Oil.	25	100,000	11	10¾			11						11⅛	11	250
Utah Con., g.	25	100,000	28	27¾	27¾	27⅛	28	27¼					27⅛	27¾	1,191
Victoria.	25	60,000			4	4							4		210
Winona, c.	25	100,000			8½		8½						8¼		210
Wolverine, c.	25	60,000	73¾	73	73¼	73							73		300
Wyandot.	25	100,000	1¼	1⅛											775

oNo Quotations Reported *Holiday †Ex Dividend. ‡Assessment Paid. Total sales, 80,551 shares.

SAN FRANCISCO.*

Name of Company.	Location.	Capitalization.	Aug. 28 H.	Aug. 28 L.	Aug. 29. H.	Aug. 29. L.	Aug. 31. H.	Aug. 31. L.	Sept. 1 H.	Sept. 1 L.	Sept. 2 H.	Sept. 2 L.	Sept. 3 H.	Sept. 3 L.	Sales
Central Eureka.	Cal.	$400,000									84				
Esperanza.	Nev.	1,000,000	.04	.03	.04		.04		.04		.05	.04	.05	.04	43,500
Gipsy Queen.	Nev.	750,000	.27		.27		.27								600
Hannapah.	Nev.	1,000,000	.25		.25		.25								1,800
MacNamara.	Nev.	500,000	.17				.18								400
Mizpah Ex. M. Co.	Nev.	1,000,000	.33						.33	.31	.30		.31		2,200
Mont-Tonopah.	Nev.	1,000,000	1.05		102½	1.00	1.05	102½	1.05	102½	102½		102½		2,350
New York Tonopah.	Nev.	1,000,000													
Paymaster	Nev.	750,000													
Pine Grove G. M. Co.	Nev.	1,000,000	.53												100
Rescue.	Nev.	500,000	.11		.10		.10	.09	.11	.10	.11		.11		7,200
South Eureka M. Co.	Cal.	3,0 0,000	.13												500
Tonopah-Belmont.	Nev.	2,000,000					1.75								250
Tonopah & Cal.	Nev.	2,000,000	.20												500
Tonopah Midway.	Nev.	1,000,000									.42				100
Tonopah Mg. Co.	Nev.														
Tonopah North Star.	Nev.	750,000	.42	.40	.46	.40	.53	.48	.46	.43	.46	.45	.49	.49	12,000
Tonopah & Salt Lake.															
Tonopah Union.	Nev.	750,000													
United Tonopah.	Nev.	1,000,000					.35	.18							1,300

*San Francisco & Tonopah Mining Exchange. Total sales 73,320 shares.

STOCK QUOTATIONS

MEXICO*. Aug. 28

Name of Company.	Shares Issued.	Last div'd	Prices. Bid.	Prices. Ask.
Durango:				
Ca. Min. de Penoles	2,500	$50.00	$3,800	$4,100
San Andres de la Sierra	200	.....	10,000	.....
Guanajuato:				
Angustias, Pozos	2,400	5.00	115	120
Cinco Senores y An., aviadoras	2,000	15.00	180	185
Cinco Senores y An., aviada	400	10.00	165	170
Providencia, San Juan de la Luz	6,000	2.00	120	130
Queensland y Australia	300	.....	60	75
Guerrero:				
Delfina, 1st serie	2,500	.....	40	45
Delfina, 2nd serie	2,500	.....	32	35
Garduno y Anexas	7,200	.....	45	60
Hidalgo:				
Amistad y Condordia	9,600	8.87	89	89½
Carmen, aviada	1,100	.....	150	160
Guadalupe Fresnillo Mill	1,000	.....	180	250
Guadalupe Fresnillo Mine	1,400	.....	70	80
La Blanca, aviadora	1,536	.....	.....	.....
La Blanca, aviada	768	.....	.....	.....
La Reina y An., aviadora	5,600	.....	22	24
Luz de Maravillas, aviadas	1,100	.....	.....	20
Maravillas y An., aviador	1,680	.....	156	200
Maravillas el Lobo	1,000	.....	130	180
Palma y An., aviador	1,800	.....	.....	12
Real del Monte	2,554	10.00	.....	.....
Refugio, aviada	12,800	.....	6	8
Santa Anay An., aviadora	1,800	.....	30	40
Santa Anay An., aviada	600	.....	25	30
Sta. Gertrudis y An., aviadas	9,600	.....	11½	12
Sta. Gertrudis y An., aviadora	28,800	1.00	90	91
Santo Tomas Apostol aviadoras	5,100	.....	2	3
San Felipe de Jesus, aviadora	3,600	.....	26	24
San Felipe de Jesus, aviada	1,200	.....	10	15
San Rafael y An., Trompillo	1,200	12.00	1,500	1,600
San Rafael y An., aviada	1,200	4.00	630	635
Soledad, aviada	960	5.00	.....	510
Sorpresa, aviada	960	5.00	335	345
.....	.....	.....	.....	.....

Name of Company.	Shares Issued.	Last div'd	Prices. Bid.	Prices. Ask.
Mexico:				
Alacran	2,400	.....	.....	60
Aldebarren	.....	.....	167	175
Buen Despacho	2,000	.....	115	120
Dos Estrellas	3,000	30.00	3,500	3,525
La Esperanza (El Oro.)	3,000	10.00	.....	1,500
La Reformia, aviadores	2,000	.....	90	94
Providencia, pagadoras	1,000	.....	.....	.....
Providencia, liberadas	900	.....	.....	.....
Santa Ana, Esperanza	2,400	.....	70	90
Michoacan:				
Luz de Borda, aviadora	3,000	.....	150	160
Luz de Borda, aviado	1,000	.....	55	70
Nuevo Leon:				
La Fraternal	1,000	.....	550	600
Norias de Bajan	1,000	.....	800	850
Santiago y An., Tlal.	4,000	.....	.....	.....
San Luis Potosi:				
Concepcion y An.	3,000	.....	85	95
El Barreno, aviadora	2,000	2.00	35	36
Sta. Maria de la Paz	2,400	20.00	735	740
San Diegoy Annexas	2,400	4.00	14	20
Zacatecas:				
Asturiana y An.	2,500	.....	75	85
Candelaria y Pinos	2,500	10.00	200	220
Cubiertas	2,400	.....	.....	.....
Esperanza y An.	2,400	.....	30	40
Lourdes	2,500	.....	25	40
Luz de Minillas, pagadoras	2,000	.....	10	15
Nueva Quebradilla, aviadoras	2,400	.....	95	100
Nueva Quebradilla, aviadas	600	.....	60	80
San Carlos y Annexas	2,500	20.00	155	165
Sta. Maria de Gaud	2,500	10.00	75	85
Miscellaneous:				
Bartolome de Medina	2,000	1.50	70	73
Guadalupe Hacienda	20,000	6.00	.....	.....
La Luz Hac. (Pachuca.)	3,750	.....	.....	.....
La Reina (Chihuahua.)	192	.....	.....	.....
Naica (Chihuahua.)	100	.....	11,000	13,000
Natividad (Oaxaca) aviadora	1,800	10.00	1,000	1,080
Natividad (Oaxaca) aviadas	600	4.00	.....	.....
San Francisco Hac.	6,000	1.00	50	55
Santa Ana Huantla Morelos	4,000	.....	.....	.....
Union Hacienda	3,000	5.00	225	240

*Values are in Mexican currency.

TORONTO, ONT.* Aug. 29.

Name of Company.	Par val	Prices. High.	Prices. Low.	Sales.
Black Tail	$1	.04	.02	..
Cariboo (Mc. K.)	1	.13	.12	.....
Cariboo (Hyd.)	1	.75	.....	..
Center Star	1	.29	.22	.....
Crows Nest, C.	100	3.50	2.75	....
Dominion Coal, com.	100	.84½	.82	.....
Dominion S. & I.	100	11.50	9.00	.....
.....	.....	.....	.....	.....
Fairview	1	.05	.03	.....
Giant	1	.03	.02	.....
Deer Trail	1	.02½	.01½	.....
Iron Mask	1	.06	.....	.....
Morrison	1	.04	.02	.....

Name of Company.	Par val	Prices. High.	Prices. Low.	Sales.
Granby Smelter	$10	4.50	3.90	.....
Mountain Lion	1	.28	.20	.....
North Star	1	.14	.11	.....
Nova Scotia Steel, com	100	85.00	.....	.....
Payne	1	.19	.16	.....
Rambler Cariboo	1	.38	.30	.....
Republic	1	.03	.01	.....
St. Eugene	1	.48	.40	.....
Virtue	1	.07	.05	.....
War Eagle Con	1	.14	.10½	.....
Sullivan	1	.06	.04	.....
Winnipeg	1	.04	.....	.....
Wonderful	1	.04	.....	.....

*Standard Stock and Mining Exchange. Total sales, none. Board adjourned until Tuesday, Sept. 8.

SALT LAKE CITY.* Aug. 29.

Name of Company	Par Val	Shares.	High	Low	Sales.
Ajax	$10	300,000	.20	.19	1,100
Butler Liberal	.....	.....	.15	.15	1,000
Carisa	1	300,000	.16¼	.14	34,400
California	1	500,000	.14	.10	17,075
Century	.....	.....	.39	.37	300
Con. Mercur	5	1,000,000	1.51½	1.45½	3,726
Daly-Judge	20	300,000	9.25	8.80	1,105
Daly-West	1	150,000	40.00	39.97½	676
L. Mammoth	20	250,000	.71	.70½	500
M. Washington	⅛	300,000	.01¾	.01⅝	4,500
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....

Name of Company	Par Val	Shares	High	Low	Sales.
May Day	¼	400,000	.11¾	.09⅜	33,700
N. Y. Bonanza	.....	.....	.26	.21	3,300
Petro	1	.....	.11	.11	1,000
Sacramento	5	1,000,000	.26¼	.26¼	1,000
Silver Shield	.....	.....	.13¾	.12	26,700
Star Con	.....	.....	.18	.13½	50,300
Swansea	.....	.....	.09	.09	2,000
Uncle Sam Con	1	500,000	.25	.23¼	3,800
Victor Con	1	500,000	.15	.14½	3,100
Wabash	.....	.....	.13	.12	1,600
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....

*By our Special Correspondent. All mines are in Utah. Total sales, 190,882 shares.

PHILADELPHIA, PA.*

Name and Location of Co.	Par val.	Sept. 2. H.	Sept. 2. L.	Sept. 3 H.	Sept. 3 L.	Sept. 4. H.	Sept. 4. L.	*Sept. 5. H.	*Sept. 5. L.	*Sept. 7. H.	*Sept. 7. L.	Sept. 8. H.	Sept. 8. L.	Sales
Am. Alkali, Mich	$50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Am. Cement	10	7¼	.....	7¼	.....	.....	.....	.....	.....	.....	.....	7¼	.....	315
Cambria Iron, Pa	50	.....	.....	47	.....	.....	.....	.....	.....	.....	.....	47	.....	27
Cambria S., Pa	50	22¼	22⅛	22¼	22	22¼	.....	.....	.....	.....	.....	22¼	.....	769
Penn. Steel, pfd	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Susq. I & S., Pa	5	1⅛	⅞	1⅛	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,100
United Gas I. Pa	50	85	84⅞	85	.....	85¼	85	.....	.....	.....	.....	85	.....	518
Warwick I. & S.	10	.....	.....	.....	.....	4⅛	4⅜	.....	.....	.....	.....	.....	.....	150
Diamond Steel	50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lehigh Navig'n	50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	68¼	.....	13
Philadelphia	50	41	40¼	.....	.....	40½	.....	.....	.....	.....	.....	40¼	40½	445
U. S. Steel	100	23⅛	28	23⅛	22⅞	23⅛	23	.....	.....	.....	.....	22¼	22⅛	3,450
U. S. Steel, pf.	100	71	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,0

*Holiday Total sales 6,887

LONDON. Aug. 28

Name and Country of Company.	Shares Issued.	Par value. £. s. d.	Latest dividend. Amt. s. d.	Latest dividend. Date.	Quotations. Buyers. £. s. d.	Quotations. Sellers. £. s. d.
Alaska-Treadwell, g., Alaska	200,000	5 0 0	3 0	Apr., 1903	4 7 6	4 12 6
Anaconda, c. s., Montana	1,200,000	5 0 0	2 0	May, 1903	4 6 3	4 8 9
Arizona, c., Def., ord.	63,444	1 0 0	5 6	Aug., 1903	7 0 0	7 10 0
Arizona, pref., ord.	316,350	1 0 0	5 6	Aug., 1903	7 2 6	7 7 6
Camp Bird, g., Colorado	738,000	1 0 0	.. 9	Sept. 1903	1 6 3	1 8 9
Central Chile, C., Chile	276,248	1 0 0	.. 6	Jan., 1902	3 0	4 0
Copiapo, c., Chile	112,500	2 0 0	6 10	May, 1903	1 7 6	1 12 6
De Lamar, g. s., Idaho	80,000	1 0 0	2 0	Nov., 1902	10 0	12 6
El Oro, g., Mexico	1,000,000	1 0 0	1 6	July. 1903	1 8 9	1 11 3
Frontino & Bolivia, g., Columbia	128,682	1 0 0	3 0	July, 1901	15 0	17 6
Le Roi, g., British Col.	200,000	5 0 0	5 0	Nov., 1899	16 3	18 9
Le Roi No. 2, g., British Col.	120,000	5 0 0	5 0	May, 1902	1 1 3	1 3 9
Mesquital, Mexico	250,000	2 0	3	Feb., 1903	2 6	3 6
Montana, g. s., Montana	657,128	1 0 0	6	April 1899	1 9	2 3
Mountain, c., Cal.	250,000	5 0 0	2 4½	May. 1903	2 17 6	3 2 6
*Stratton's Independence, Colorado	1,000,007	1 0 0	1 0	Aug., 1903	7 0	8 0
St. John del Rey., g., Brazil	546,265	1 0 0	8	June, 1903	15 6	16 6
Utah Con., g . c. (Highland Boy), Utah	300,000	1 0 0	6 3	July, 1903	5 0 0	5 10 0
Ymir, g., British Col.	200,000	1 0 0	1 0	Mar., 1902	5 0	7 6
European :						
Linares, l., Spain	15,000	3 0 0	1 0	Mar., 1903	2 0 0	2 10 0
Mason & Barry, c., sul., Port'g'l.	185,172	1 0 0	11 0	May, 1903	3 10 0	3 15 0
Rio Tinto, c., Spain	325,000	5 0 0	27 6	May, 1903	48 15 0	49 0 0
Rio Tinto, pref., Spain	325,000	5 0 0	2 6	May, 1903	6 2 6	6 7 6
Tharsis, c., Spain	625,000	2 0 0	6 0	May, 1903	4 0 0	4 5 0
Australia and New Zealand :						
Assoc. Gold Mines, W. Australia	495,388	1 0 0	2 0	July, 1903	1 17 6	1 18 9
Briseis, Tin, Tasmania	600,000	1 0 0	.....	.....	5 0	6 0
*Broken Hill Pr'p, s., N. S. Wales	980,000	8 0	1 0	Aug., 1903	1 9 6	1 10 6
*Cosmopolitan Prop., W. Australia	385,000	1 0 0	1 0	May, 1903	15 0	15 6
Golden Horse Shoe, W. Australia	300,000	5 0 0	6 0	Apr., 1903	7 8 9	7 11 3
*Great Fingall Con., W. Australia	250,000	1 0 0	5 0	Apr., 1903	7 16 3	7 18 9
Great Bo'd'r Pr'p, W. Australia	1,750,000	2 0	6	June, 1903	1 7 3	1 7 9
Ivanhoe Gold Corp., W. Australia	200,000	5 0 0	4 0	Apr., 1903	8 5 0	8 7 6
Kalgurli, g., W. Australia	120,000	1 0 0	2 6	July, 1903	4 1 3	4 3 9
Lake View Cons., g., W. Australia	250,000	1 0 0	rts.	Aug., 1902	2 1 3	2 3 9
Mt. Lyell M. & R. I., c., Tasmania	275,000	3 0 0	4 3	Sept., 1903	3 1 3	3 3 9
Mt. Morgan, g., Queensland	1,000,000	1 0 0	3	Sept., 1903	2 17 6	3 0 0
Waihi, g., New Zealand	497,412	1 0 0	2 6	June, 1903	5 5 0	5 7 6
Indian:						
*Champion Reef, g., Colar Fields	473,000	10 0	5 6	Aug., 1903	7 10 9	7 12 6
Mysore Gold, Colar Fields	566,043	10 0	4 0	July, 1903	6 17 6	7 0 0
Nundydroog, g., Colar Fields	484,000	10 0	1 6	Mar., 1903	2 10 0	2 11 3
Ooregum, g., Colar Fields	343,000	10 0	1 9	Aug., 1903	1 11 3	1 13 9
Ooregum, g., pref., g., Colar Fields	240,000	10 0	1 9	Aug., 1903	2 0 0	2 2 6
African :						
*Angelo, g., Transvaal	600,000	1 0 0	6 0	Aug., 1903	6 17 6	7 0 0
Bonanza, g., Transvaal	200,000	1 0 0	10 0	Aug., 1903	3 7 6	3 10 0
British South Africa	4,436,019	1 0 0	rts.	May, 1889	2 12 6	2 13 9
Cape Copper, S. Africa	300,000	2 0 0	1 0	July, 1903	2 13 6	2 16 3
Cape Copper, pref., S. Africa	75,000	2 0 0	1 0	July, 1903	2 10 0	2 15 0
*City and Sub'n (New), g., Transvaal	340,000	4 0 0	4 0	Aug., 1903	6 10 0	6 15 0
Crown Reef, g., Transvaal	120,000	1 0 0	4 0	Aug., 1903	18 0 0	18 10 0
De Beers Con., d., pref., Cape Colony	800,000	2 10 0	10 0	Aug., 1903	19 5 0	19 7 6
De Beers Con., def.	1,000,000	2 10 0	15 0	Aug., 1903	20 0 3	20 8 9
East Rand, Prop., Transvaal	970,000	1 0 0	5 0	Aug., 1903	7 7 6	7 8 9
Ferreira, g., Transvaal	90,000	1 0 0	15 0	Aug., 1903	20 5 0	20 15 0
Geldenhuis Est., g., Transvaal	200,000	1 0 0	6 0	Aug., 1903	6 3 9	6 6 3
Geduld, g., Transvaal	400,000	1 0 0	rts.	Mar., 1902	6 10 0	6 12 6
Henry Nourse, g., Transvaal	125,000	1 0 0	10 0	Aug., 1903	8 2 6	8 7 6
Jagersfontein, d., Orange, F. S.	200,000	5 0 0	6 0	Nov., 1889	28 17 6	29 2 6
Jubilee, g., Transvaal	50,0 0	1 0 0	5 0	July, 1903	5 7 6	5 12 6
Jumpers, Transvaal	100,000	1 0 0	5 0	Aug., 1899	3 10 0	3 15 0
Langlaagte Est., g., Transvaal	470,000	1 0 0	3 0	Aug., 1903	3 16 3	3 18 9
May Con., g., Transvaal	288,750	1 0 0	3 0	Aug., 1903	4 1 3	4 3 9
Meyer & Charlton, g., Transvaal	100,000	1 0 0	3 0	Aug., 1903	5 2 6	5 7 6
Modderfontein, g., Transvaal	290,000	1 0 0	rts.	Apr., 1902	9 13 9	9 16 3
Namaqua, c., Cape Colony	94,331	2 0 0	2 0	June, 1903	3 0 0	3 5 0
Primrose (New), g., Transvaal	325,000	1 0 0	2 0	Aug., 1903	3 17 6	4 0 0
Rand Mines, g., S. Africa	1,795,956	5 0 0	4 0	Aug., 1902	10 1 3	10 2 6
Robinson, g., Transvaal	750,000	5 0 0	5 6	Aug., 1903	10 2 6	10 7 6
*Robinson Deep, g., Transvaal	950,000	1 0 0	2 0	Aug., 1903	4 12 6	4 15 0
*Rose Deep, Transvaal	425,000	1 0 0	2 0	Aug., 1903	8 2 6	8 7 6
Salisbury, g., Transvaal	100,000	1 0 0	2 0	Mar , 1899	2 7 6	2 8 9
Sheba, g., Transvaal	1,075,000	1 0 0	6	July, 1599	7 17 6	18 9
Village Main Reef, Transvaal	400,000	1 0 0	4 0	June, 1903	15 0	8 0 0
Wemmer, Transvaal	80,000	1 0 0	10 0	July, 1903	11 2 6	11 7 6

c.—Copper. d.—Diamonds. g.—Gold. l.—Lead. s.—Silver. Ex-Dividend.

LONDON (By Cable.)*

Name of Company.	Sept. 1. £. s. d.	Sept. 8. £. s. d.	Name of Company.	Sept. 1. £. s. d.	Sept. 8. £. s. d.
Anaconda	4 7 6	4 7 6	Jagersfontein	29 0 0	29 0 0
British South Africa	2 13 9	2 13 9	Johannesburg Invest.	3 2 6	3 2 6
Camp Bird	1 7 9	1 6 6	Modderfontein	.. .. ..	9 17 6
Con. Gold Fields	6 11 3	6 7 6	Rand Mines	10 1 3	9 8 9
De Beers Con. def.	20 13 9	20 13 9	Rio Tinto, com.	49 0 0	48 17 6
East Rand	7 8 9	7 5 7½	Simmer & Jack	1 8 9	1 8 1½
El Oro, Mex.	1 10 0	1 10 0	Tomboy	1 12 6	1 12 6

*Furnished by Wm. P. Bonbright & Co., 15 Wall St., New York.

PARIS. Aug. 20

Name of Company.	Country.	Product.	Capital Stock. Francs.	Par value. Fr.	Latest divs. Fr.	Prices. Openinz. Fr.	Prices. Closing. Fr.
Alameda	California	Oil	1,000,000	1	9.50	9.00	9.50
Auzin	France	Coal	.....	.....	290.00	5,800.00	5,725.00
Boleo	Lower Cal.	Copper	.....	500	176.00	1,390.00	1,400.00
Canadian Am.	Can.	Coal	.....	20	.....	29.75	31.00
Champ d'Or	S. Africa	Gold	3,375,000	25	3.75	18.00	18.00
Courrieres	France	Coal	600,000	300	110.00	2,920.00	2,920.00
Fraser River	Brit. Col'mb.	Gold	250,000	25	.....	5.50	5.50
Huanchaca	Bolivia	Silver	40,000,000	125	5.00	83.00	83.75
Laurium	Greece	Zinc, Lead	16,300,000	500	25.00	358.00	364.00
Malfidano	Italy	Zinc	12,500,000	500	50.00	567.00	575.00
Metaux, Cie. Fran. de	France	Metal dealers.	25,000,000	500	22.50	488.00	494.00
Mokta-el-Hadid	Algeria	Iron	18,312,000	500	40.00	825.00	835.00
Nickel	N. Caled'nia	Nickel	15,000,000	250	22.50	455.00	459.00
Sedalia & California	Calif., U. S.	Oil	1,000,000	1	.....	6.25	6.50
Vielle Montagne	Belgium	Zinc	9,000,000	30	30.00	674.00	674.00
Wyoming	California	Oil	.....	25	.....	282.00	293.00

ST. LOUIS, MO. Sept. 5.

Name.	Par Val.	Shares.	Prices. Bid.	Prices. Ask.
Am.-Nettie, Colo.	$10	300,000	$0.50	$0.55
Catherine Lead, Mo.	10	50,000	1.25	2.25
Central Coal & C.	100	51,250	62.88	63.50
Central C. & C., pf.	100	18,750	72.25	74.00
Central Lead, Mo.	10	100,000	110.00	125.00

Name.	Par Val.	Shares.	Prices. Bid.	Prices. Ask.
Columbia Lead, Mo.	$10	50,000	$10.00	11.00
Con. Coal, Ill.	100	50,000	22.00	22.75
Doe Run Lead Co.	100	15,000	110.00	120.00
Granite Bimet. Mt.	10	100,000	.47	.52
St. Joe Lead, Mo.	10	600,000	16.00	17.00

*By our Special Correspondent.

CHEMICALS, MINERALS, RARE EARTHS, ETC.—CURRENT WHOLESALE PRICES.

(See also Market Reviews.)

	Cust.	Meas.	Price.
ABRASIVES—			
Carborundum, f.o.b. Niagara Falls, Powd., F. FF. FFF.	lb.		$0.08
Grains	"		.10
Corundum, N. C.	"		.07@.10
Chester, Mass.	"		.04½@.05
Barry's Bay, Ont.	"		.07½@.09½
Mont. car-lots, f.o.b. Chicago	"		.07@.07½
Crushed Steel, f.o.b. Pittsburg	"		.05½
Emery, Turkish flour in kegs	"		.03¼
Grains, in kegs	"		.05@.05½
Naxos flour, in kegs	"		.03½
Grains, in kegs	"		.05@.05½
Chester flour, in kegs	"		.03½
Grains, in kegs	"		.05@.05½
Peekskill, f.o.b. Easton, Pa., flour, in kegs	"		.01½
Grains, in kegs	"		.02½
Crude, ex-ship N. Y.; Abbott (Turkey)	lg. ton		26.50@30.00
Kuluk (Turkey)	"		22.00@24.00
Naxos (Greek) h. gr.	"		26.00
Garnet, as per quality	sh. ton		25.00@35.00
Pumice Stone, Am. Powd.	lb.		.01½@.02
Italian, powdered	"		.01½
Lump, per quality	"		.04@.40
Rottenstone, ground	"		.02½@.04½
Lump, per quality	"		.06@.20
Rouge, per quality	"		.10@.30
Steel Emery, f.o.b. Pittsburg	"		.07
ACIDS—			
Boracic, crystals	"		.10¾@.11
Powdered	"		.11¼@.11½
Carbonic, liquid gas	"		.12½
Chromic, crude	"		.20
Hydrofluoric, 30%	"		.03
48%	"		.05
60%	"		.11
Sulphurous, liquid anhy. f.o.b. Bound Brook, N.J.	"		.06
ALCOHOL—Grain	gal.		2.30@2.40
Refined wood, 95@97%	"		.50@.55
Purified.	"		1.25@1.30
ALUM—Lump	100 lbs.		1.75
Ground	"		1.85
Porous	"		1.00
Powdered	"		3.00
Chrome, com'l	"		2.75@3.00
ALUMINUM—			
Nitrate	lb.		1.50
Oxide, com'l, common	"		.06½
Best	"		.20
Pure	"		.80
Hydrated	100 lbs.		2.60
Sulphate, com'l	"		1.25@1.50
AMMONIA—			
Aqua, 16°	lb.		.03
18°	"		.03¼
20°	"		.03¾
26°	"		.03½
AMMONIUM—			
Carbonate, lump	"		.07½
Powdered	"		.08¼
Muriate	"		.05⅝
Lump	"		.09
Nitrate, white pure (99%)	"		.12
Phosphate, com'l	"		.09
Pure	"		.12
ANTIMONY—Glass	"		.30@.40
Needle, lump	"		.05½@.06
Powdered, ordinary	"		.05¾@.07¾
Oxide, com'l white, 95%	"		.03½
Com'l white, 95%	"		.12
Com'l gray	"		.07
Sulphuret, com'l	"		.16
ARSENIC—White powd.	"		.02¼@.03
Red	"		.06⅜@.06½
ASPHALTUM—			
Ventura, Cal.	sh. ton		32.00
Cuban	lb.		.01½@.03½
Egyptian, crude	"		.05½@.06
Trinidad, refined	sh. ton		35.00
San Valentino (Italian)	lg. ton		16.00
Seyssel (French), mastic	sh. ton		21.00
Gilsonite, Utah, ordinary	lb.		.03
Select	"		.03¾
BARIUM—			
Carb. Lump, 80@90%	sh. ton		25.00@27.00
92@98%	"		26.00@29.00
Powdered, 80@90%	lb.		.01¾@.02
Chloride, com'l	100 lbs.		1.67½@1.76
Chem. pure cryst	lb.		.05
Nitrate, powdered	"		.05⅞

	Cust.	Meas.	Price.
BARIUM			
Sulphate (Blanc Fixe)	lb.		$0.01⅞
BARYTES—			
Am. Crude, No. 1	sh. ton		9.00
Crude, No. 2	"		8.00
Crude, No. 3	"		7.75
Floated	"		18.50
Foreign gray	"		13.50
Snow white	"		17.00
Floated	"		18.00
BAUXITE—Ga. or Ala. Mines:			
First grade	lg. ton		5.50
Second grade	"		4.75
BISMUTH—Subnitrate	lb.		2.00
Subcarbonate	"		2.25
BITUMEN—"B"	"		.03¼
"A"	"		.05
BONE ASH	"		.02¼@.02½
BORAX	"		.07¼@.07½
BROMINE—Bulk	"		.40
CADMIUM—Metallic	"		1.40
Sulphate	100 lbs.		2.00@2.50
CALCIUM—Acetate, gray	"		1.40
" brown	"		.95
Carbide, ton lots f.o.b. Niagara Falls, N. Y., for Jersey City, N. J.	sh. ton		70.00
Carbonate, ppt.	lb.		.05
Chloride	100 lbs.		.70@.90
CEMENT—			
Portland, Am., 400 lbs.	bbl.		2.00@2.15
Foreign	"		1.95@2.50
"Rosendale," 300 lbs.	"		.80
Slag cement,	"		1.50@1.60
CERESINE—			
Orange and Yellow	lb.		.13
White	"		.14
CHALK—Lump, bulk	sh. ton		3.25
Ppt. per quality	lb.		.04@.05¼
CHLORINE—Liquid	"		.30
Water	"		.10
CHROME ORE			
(50% ch.) ex-ship N. Y.	lg. ton		24.75
Bricks f.o.b. Pittsburg	M		175.00
CLAY, CHINA—Am. com., ex-dock, N. Y.	lg. ton		8.25
Am. best, ex-dock, N. Y.	"		9.25
English, common	"		10.50
Best grade	"		16.25
Fire Clay, ordinary	sh. ton		4.25
Best	"		6.00
Slip Clay	"		5.00
COAL TAR PITCH	gal.		.08
COBALT—Carbonate	lb.		1.75
Nitrate	"		1.50
Oxide—Black	"		2.26@2.30
Gray	"		2.28@2.40
Smalt, blue ordinary	"		.06
Best	"		.20
COPPERAS—Bulk	100 lbs.		.47½
In bbls.	"		.52½
COPPER—Carbonate	lb.		.18@.19
Chloride	"		.25
Nitrate, crystals	"		.35
Oxide, com'l	"		.19
CRYOLITE	"		.06½
EXPLOSIVES—			
Blasting powder, A	25-lb. keg		.65
Blasting powder, B	"		1.40
"Rackarock," A	lb.		.25
"Rackarock," B	"		.18
Judson R.R. powder	"		.10
Dynamite (20% nitro-glycerine)	"		.13
(30% nitro-glycerine)	"		.14
(40% nitro-glycerine)	"		.15
(50% nitro-glycerine)	"		.16½
(60% nitro-glycerine)	"		.18
(75% nitro-glycerine)	"		.21
Glycerine for ultro (32-2-10° Be.)	"		.12½@.13⅝
FELDSPAR—Ground	sh. ton		8.00@9.00
FLINT PEBBLES—Dan. Best	lg. ton		14.75
French, Best	"		11.75
FLOURSPAR—			
Am. lump, 1st grade	sh. ton		14.40
2d grade	"		13.90
Gravel and crushed, 1st gr.	"		13.40
2d grade	"		12.40
Ground, 1st grade	"		17.90
Ground, 2d grade	"		16.50
Foreign, lump	"		8.00@12.00
Ground	"		11.50@14.00
FULLER'S EARTH	100 lbs.		.80

	Cust.	Meas.	Price.
GRAPHITE—Am. f.o.b. Providence, R. I., lump	sh. ton		$8.00
Pulverized	"		30.00
Am. pulv., other than R. I., f. o. b., New York	"		45.00
Best flake	"		150.00
German, com. pulv.	lb.		.01¼@.01½
Best pulverized	"		.01½@.02
Ceylon, common pulv.	"		.02¾@.03½
Best pulverized	"		.04@.08
Italian, pulv	"		.01¼
GYPSUM—Ground	sh. ton		8.00@8.50
Fertilizer	"		7.00
Rock	lg. ton		4.00
English and French	"		14.00@16.00
INFUSORIAL EARTH—Gr'd.			
American best	"		20.00
French	"		37.50
German	"		40.00
IODINE—Crude	100 lbs.		2.45
IRON—Muriate	lb.		.05
Nitrate, com'l	"		.01¾
True	"		.04
Oxide, pure copperas color	"		.05@.10
Purple-brown	"		.02
Venetian red	"		.01@.01½
Scale	"		.01@.03
KAOLIN—(See China Clay.)			
KRYOLITH—(See Cryolite.)			
LEAD—Acetate, white	"		.08¼@.08½
Brown	"		.06¼@.06½
Nitrate, com'l	"		.06½
" gran.	"		.08¼
LIME—Com., abt. 250 lbs.	bbl.		.75
Finishing	"		.95
MAGNESITE—Greece.			
Crude (95%)	lg. ton		5.50@6.00
Calcined	sh. ton		15.50
Bricks, best imp., f.o.b. N.Y.	M.		155.00
" domes., per qual., f.o.b. Pittsburg	"		160.00@200.00
MAGNESIUM—			
Carbonate, light, fine pd.	lb.		.05
Blocks	"		.07@.09
Chloride, com'l	"		.01¾
Fused	"		.20
Nitrate	"		.60
Sulphate	100 lbs.		.75@.95
MANGANESE—			
Crude powd.			
70@75% binoxide	lb.		.01¼@.01½
75@85% binoxide	"		.01½@.02¼
85@90% binoxide	"		.02¼@.03¼
90@95% binoxide	"		.03¼@.05½
Carbonate	"		.16@.20
Chloride	"		.04
Ore, 50%, Foreign	unit		.18@.19
Domestic, 1st quality	"		.30
MARBLE—Flour	sh. ton		6.00@7.00
MERCURY—Bichloride	lb.		.77
MICA—N. Y. gr'nd, coarse	sh. ton		33.00@38.00
Fine	lb.		.00½@.02
Sheets are sold as to size and quality.			
MINERAL WOOL—			
Slag, ordinary	sh. ton		19.00
Selected	"		25.00
Rock, ordinary	"		32.00
Selected	"		40.00
NICKEL Oxide, No. 1	lb.		1.00
No. 2	"		.60
Sulphate	"		.20@.21
OILS—Black, reduced 29 gr.:			
25@30, cold test	gal.		.13@.13½
15, cold test	"		.14@.14½
Zero	"		.18½@.19
Summer	"		.13@.13½
Cylinder, dark steam ref.	"		.14½@.15½
Dark, filtered	"		.18½@.19
Light, filtered	"		.20½@.21
Extra cold test	"		.25@.31
Gasoline, 86 @90°	"		.17@.22
Naphtha, crude, 68°@72°	bbl.		12.40
"Stove"	gal.		.15
Linseed, domestic raw	"		.34@.37
Boiled	"		.38
Calcutta, raw	"		.65
OZOKERITE	lb.		.11½
PAINTS AND COLORS—			
Chrome green, common	"		.03
Pure	"		.16
Yellow, common	"		.10¼
Best	"		.14
Lampblack, com'l	"		.04½
Refined	"		.07
Litharge, Am. pow'd	"		.05½@.06
English flake	"		.08¼@.08½
Glassmakers'	"		.06¼@.08¼

	Cust.	Meas.	Price.
PAINTS AND COLORS—			
Metallic, brown	sh. ton		$19.00
Red	"		18.00
Ocher, Am. common	"		9.25@10.00
Best	"		21.25@25.00
Dutch, washed	lb.		.04¾
French, washed	"		.01½@.01⅝
Orange mineral, Am.	"		.08
Foreign, as to make	"		.08½@.10¼
Paris green, pure, bulk	"		.12
Red lead, American	"		.06¼@.06½
Foreign	"		06½@.06
Turpentine, spirits	gal.		.59@.59¼
White lead, Am., dry	lb.		.05½@.05¾
American, in oil	"		.07@.09
Foreign, in oil	"		.07@.07¼
Zinc, white, Am., ex. dry	"		.04⅝@.04¾
Foreign, red seal, dry	"		.06@.06½
Green seal, dry	"		.06¼@.06½
POTASH—			
Caustic, ordinary	"		.04½@.04⅞
Elect. (90%)	"		.06¼
POTASSIUM—			
Bicarbonate cryst	"		.08½
Powdered or gran	"		.14
Bichromate, Am	"		.08½@.08¾
Scotch	"		.08½@.09
Bromide	"		@.30
Carbonate (80@85%)	"		.03½@.04⅜
Chlorate, powd	"		.07¼@.07⅜
Crystals	"		.07@.07½
Chromate	"		.35
Cyanide (98@99%)	"		.20
Kainit	lg. ton		9.30
Manure salt, 20%	100 lbs.		.66
D'le Manure Salt, 48@53%	"		1.12
Muriate, 80@85%	"		1.83
95%	"		1.86
Permanganate	lb.		.09½@.09⅝
Prussiate, yellow	"		.14@.14½
Red	"		.36
Sulphate, 90%	100 lbs.		2.11
96%	"		2.14
Sylvanit	unit		.41
QUARTZ—(See Silica).			
SALT—N. Y. com. fine 280 lbs	bbl.		.72@1.18
N. Y. agricultural	sh. ton		4.40
SALTPETRE—Crude	100 lbs.		3.30
Refined	"		4.00@4.50
SILICA—Best foreign	lg. ton		10.00@11.00
Ground quartz, ord.	sh. ton		6.00@8.00
Best	"		12.00@13.00
Lump quartz	"		2.50@4.00
Glass sand	"		2.75
SILVER—Chloride	oz.		.65
Nitrate Crystals	"		.37
Oxide	"		.85@1.10
SODIUM—			
Bicarb., ord., bulk f.o.b. wk's.	100 lbs.		
Extra domes., f.o.b. w'ks.	"		3.50
Foreign, f.o.b. N. Y.	"		1.60
Bichromate	lb.		.06¼
Carbonated ash, high test, in bags, f.o.b. works	100 lbs.		.75@.82½
Foreign, f.ob. N. Y.	"		.90@.92½
Caustic, 60@76%, f.o b. w'ks.	"		1.65@1.80
Foreign, f.o.b N. Y.	"		1 90@2.00
Chlorate, com'l	"		.07¼@.07⅝
Hyposulphite, Am.	"		1.60@1.65
German	"		1.70@1.90
Nitrate, spot	"		2.15
Shipments	"		2.05
Peroxide	lb.		.45
Phosphate	"		.02½@.02¾
Prussiate	"		.09½
Sal soda, f.o.b. works	100 lbs.		.60
Foreign, f.o.b. N. Y.	"		.67½
Silicate, conc.	lb.		.05
Com'l	"		.01
Sulphate, com'l	100 lbs.		.82½
Sulphide	lb.		.01¾
Sulphite crystals	"		.02½
SULPHUR—Roll	100 lbs.		1.85
Flour	"		1.90
Flowers, sublimed	"		2.15
TALC—N. C., 1st grade	sh. ton		20.00
N. Y., Fibrous, best	"		10.28
French, best	100 lbs.		2.00
Italian, best	"		2.25
TAR—Regular	bbl.		2.65
Oil, bbl.	"		4.75
TIN—Crystals	lb.		.22½@.23
Oxide	"		.45
URANIUM—Oxide	"		2.25@3.00
ZINC—Metallic, ch. pure	"		.07@.09¾
Carbonate, ppt.	"		.09
Chloride solution, com'l	"		.02¾
Chloride granular	"		.04¼@.04⅝
Dust	"		.04½@.04¾
Sulphate	"		.02¼@.02⅝

THE RARE EARTHS.

BORON—Nitrate	lb.	$1.50
CALCIUM—Tungstate (Scheelite)	"	.60
CERIUM—Nitrate	"	10.00
DIDYMIUM—Nitrate	"	35.00
ERBIUM—Nitrate	"	40.00
GLUCINUM—Nitrate	"	20.00
LANTHANUM—Nitrate	"	30.00
LITHIUM—Carbonate	"	1.35
LITHIUM—Nitrate	oz.	.60
STRONTIUM—Nitrate	lb.	.07¼@.08¼
THORIUM—Nitrate 49@50%	oz.	4.50
URANIUM—Nitrate	oz.	.25
YTTRIUM—Nitrate	lb.	40.00
ZIRCONIUM—Nitrate	"	8.00

NOTE.—These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts. Readers of the ENGINEERING AND MINING JOURNAL are requested to report any corrections needed, or to suggest additions which they may consider advisable.